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OF

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A MONTHLY REVIEW OF SURGICAL SCIENCE AND PRACTICE.

EDITED BY

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ANNALS OF SURGERY.

A METHOD OF WIRING FRACTURES OF THE PATELLA.

BY W. L. AXFORD, M.D.,

CHICAGO, ILL.

THE best method of treatment of fracture of the patella may be said to be still undetermined, many surgeons clinging to the old methods, claiming for them good results and maintaining that the operation of opening the joint and wiring the fragments is too dangerous to life and limb to become a recognized method of procedure; others, with full faith in antiseptics, do not hesitate to open the joint and approximate the fragments, claiming to obtain by this operation bony union with full restoration of function.

While the ideal treatment is that by which bony union with unimpaired function is secured, and while it is a well known fact that by the old methods bony union is the exception and functional impairment of the limb a frequent result of too-long a ligamentous band between the fragments, still it is a question whether the non-operative treatment, with inferior results but absolutely free from danger, is not to be preferred to so serious an operation as wiring by the open method has proved to be.

Hamilton says that in all cases treated by himself he has obtained results practically perfect, twenty-five uniting by ligaments not more than one-half an inch in length, while in two cases he believes bony union to have occurred. In no case, says he, was there any impairment of the functions of the limb. The simple and inexpensive apparatus of this surgeon is surely within the reach of any practitioner.

Again, in many cases where the union is by ligament the

functions of the limb are impaired *not* as the result of too long a band of union, but because of certain changes which have taken place in the quadriceps. This muscle has atrophied from injury and long disuse, and the function of the limb can be restored by measures which tend to restore the muscle to its normal condition.

That the results of those who do the open operation and wire the fragments are unsatisfactory is well known. The limb and even the life of the patient have been sacrificed; and this, in the face of the fact, that the results by the old method were fairly good, though all surgeons have not been able to obtain such cures as were wrought by Hamilton, is surely an unjustifiable risk for any surgeon to subject his patient to, however great his faith in antiseptics; for, as has been pithily remarked, "antiseptic surgery is not cock-sure surgery."

Were the principles of antiseptic surgery less perfectly understood, there might still be a chance that a more perfect technique would produce better results; unfortunately, at this late day there is not much ground for improvement.

That there is something to be desired in the treatment of this fracture, and that all do not obtain satisfactory results by the old methods is well illustrated by the reports of Brunner in 1886. He had operated on forty-five cases of old fracture of the patella in which the function of the limb was so much impaired that crutches were necessary. Of these forty-five cases only eighteen recovered without fever, purulent synovitis occurred in eleven, one thigh was amputated, and three died. Forty-five living patients, though crippled, can scarcely be replaced by forty-two—some, it is true, cured, some worse off than before by reason of suppurative inflammation—one with one leg, and three corpses. If in forty-five cases operated on at a period remote from the injury, when all disturbances in the joint had ceased, such results are obtained, and by a single operator, what can be expected in the case of recent fractures when the joint is presumably irritated and prone to inflammation, necessarily operated on by this surgeon or that surgeon, more or less experienced, as the case may be?

From time to time along with reports of successful cases (seven recently reported by Sir Joseph Lister) come reports of

amputation or death following wiring of the patella by the open method, until it seems to be a foregone conclusion that the operation should be abandoned as too dangerous to life and limb. It is never justifiable to subject any human being to an operation so often followed by such grave consequences for an accident not in itself threatening life, which at the most can but result in impairment of the function of a limb.

One of the two factors which impair the function of the limb after this fracture, the atrophy of the quadriceps can, as has been shown by Tilanus, be removed by massage and exercise of the muscle; if now a safe and reasonably certain method of operation can be devised, so that bony union shall be the rule and not the exception, the ideal treatment of the hitherto unsatisfactory fracture will be realized. With this end in view the following method has been devised, and it is hoped that it may seem sufficiently promising and simple of application to merit a trial by the profession.

There are four causes to which the failure of bony union in patellar fracture is attributed; the peculiar blood supply to the bone, effusion into the joint, muscular action and, as has recently been pointed out by Macewen, the engagement of the prepatellar aponeurosis between the ragged edges of the fragments. Since bony union usually occurs when the three latter elements of failure are eliminated, the first cause mentioned may be regarded rather as the fancy of the philosophical anatomist than as an actual source of danger to the success of the practical surgeon.

If now the effusion be removed, the aponeurosis cleared away from the fractured edges, muscular contraction overcome, the bony edges held firmly in apposition, and the nutrition of the quadriceps maintained during the period of rest necessary to a cure, bony union with full restoration of function should result, provided the joint be not infected.

Immediately on the occurrence of fracture of the patella the limb should be placed in a posterior splint, soft sheep's wool sponges applied to the sides and over the front of the knee and snugly held in place by the roller bandage. If ice water be kept constantly trickling on the bandage so as to saturate the sponges and keep them well distended, the most potent factors

in the prevention of inflammation and limitation of effusion, rest, elastic pressure and cold will be utilized. At the end of forty-eight hours the knee would in all probability be ready for operation. Strict antisepsis should be observed. If the effusion into the joint be so great as to prevent easy approximation of the fragments, it can be removed by Schede's method. Should the fragments still refuse to come together, Bergmann's plan of freeing the bony attachment of the ligamentum patellæ may be resorted to. If on rubbing the fractured surfaces together the pressure of the prepatellar aponeurosis seem to present an obstacle to union, it can probably be freed by manipulation of one surface on the other; if not readily removed there can be no objection to passing a tenotome into the joint for the purpose of clearing the fractured surfaces. For the purpose of wiring the fragments I have modified Brainard's drill. As small a size as is compatible with the requisite strength is made one inch longer than usual, and at the point is provided with an eye large enough to admit a medium-sized silver or iron wire. Two such drills are necessary. An assistant holds the fragments firmly in apposition, the drill is entered from above, traverses the bone in the long axis of the limb, emerges from the skin below the patella, is disengaged from the handle and left in position, serving to support the fragments temporarily. The other drill is now passed parallel to the first, from below upward, the wire hooked into the eye, the drill withdrawn, and the ends of the wire twisted over the bone. Drill number one is now armed with wire and withdrawn. A few layers of gauze are placed over the patella, and the ends of the wire pushed through. Over all is placed a cap of hard rubber, leather or felt, perforated for the wires, the ends of which are now passed through, drawn tight and twisted. The Bavarian or open plastic splint may now be applied, and if any reaction be feared the sponges may be reapplied, treating the fracture as at first till all danger be passed. Attention should be paid to the quadriceps during recovery.

By this method it is held that the minimum danger of infection is incurred, and a reasonable chance for bony union is secured. Indeed, the joint is not necessarily entered except for the purpose of getting rid of the effusion, or, perhaps, when

the aponeurosis is freed. If the fragments are kept closely approximated during the drilling, the drill will not enter the joint at all.

Experiments on the cadaver by Dr. L. A. Greenfelder, of the Michael Reese Hospital, and myself have convinced us of the ease with which this plan can be carried out. The greatest difficulty we encountered was in fracturing the patella without too much comminution. Even then we had no trouble in holding many fragments in close apposition. It is surprising how easy the drill traverses the bone, the only point at which any force is necessary being the point of entrance, the cancellous interior and hard bone at the point of exit giving almost no resistance.

THE RADICAL CURE OF HERNIA.

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AT the annual meeting of the British Medical Association in Dublin, the chief subject of discussion in the surgical section was the Radical Cure of Hernia. Not less than ten papers on this were read, exclusive of numerous speeches. The collective amount of experience represented was very great, amounting to hundreds of cases, individual experience generally ranging from twenty to a hundred cases.

Most of these contributions lost force from the obvious fact that each writer and speaker was entirely, or all but entirely, inexperienced in every form of operation except that practised by himself.

Another thing to take exception to was the apparent vagueness existing in most minds as to the indications which justified an operation. The general idea seems to be that there are a considerable number of herniæ which "cannot be kept up by any form of truss" or which are so large in size that something ought to be done.

We venture to say very positively that among reducible herniæ, rebelliousness to treatment by truss is one of the rarest indications for operation. In plain language, it is usually an indication of incapacity in the instrument makers and inexperience in the surgeon.

It was not clear that any but a small number of the writers and speakers realized the vast difference in suitability for operation between femoral and inguinal herniæ, or between adults and children. One of the speakers announced himself as always ready to operate on children. The most experienced operator on hernia present took an almost diametrically opposite view, and surely the right one.

Almost all the cases referred to had been operated on by some form of open operation involving either suture of the neck of the sac or of the walls of the canal or both, or else some modification of this operation, or of one of its stages.

A not inconsiderable fatality had to be acknowledged, although the enthusiastic operator was sometimes disposed to exonerate the operation by hook or by crook.

In short the discussion at Dublin displayed far too much tendency to make comparisons without knowledge, and to roundly assert what were sometimes merely fanciful beliefs. For example take the way in which the important question of the indications for wearing a truss after operation was dealt with. On one side there were gentlemen to whom the application of a truss to the site of an operation for the radical cure of hernia was plainly most mischievous, calculated only to cause the absorption of plastic lymph, etc. Surely surgery has outgrown this way of treating an important question, a way which involves a false assumption of knowledge of the nature of the plastic process in the canal.

On the other side the belief in the value of trusses as means of confirming a radical cure after operation seemed to be supported by little else than a vague general impression; only one speaker gave any comparative observations.

We will now briefly notice the papers one by one.

Mr. Mitchell Banks who opened the discussion had operated no less than one hundred and six times up to February, 1887. He had adhered to a single method of procedure for

two reasons, "first, because, in order to judge of the value of any given operation, it must be done many times by the same man, who is then in a position to judge accurately of its good qualities and its effects, and, secondly, because the operation is the simplest that has yet been devised." He makes no pretence to originality, and though there are a considerable number of surgeons who speak of "Banks' operation" it must in justice be allowed that the Liverpool surgeon is not himself to blame for any error thereby implied. The form of operation in question is the type of the procedures now in general favor. In inguinal hernia the sac, after being cleanly dissected out, is opened, and all bowel is replaced and adherent omentum tied and cut away. The sac is then well pulled down, ligatured as high up in the canal as possible, and removed. Finally the pillars of the ring are brought together by two or three silver sutures, which are left in position. In femoral hernia the cleaning and removal of the sac constitute the whole operation, and no attempt is made to close the femoral aperture. "In ventral and umbilical hernia use is frequently made of the whole or part of the sac as a kind of plug to stop the aperture, which is generally large, and in which it is seldom possible to adopt any means of approximating the edges which seems likely to be permanent."

Of Mr. Banks' one hundred and six cases, thirty-eight were cases of strangulation. In the tables given, the non strangulated are divided into two groups, the first in which the herniæ were "of moderate size," and the second where the herniæ were "very large" or "enormous" and "not capable of support by trusses." Of the latter class Mr. Banks states that they are most serious things to tackle. The operation is usually difficult and prolonged, and the dangers to be met and overcome are both numerous and various. All must agree with him in these statements; but, assuming the operation to be carefully and accurately done, I have no hesitation in saying that all I have seen and read of such cases, points to the fact that the one and only *great* danger these cases run is that of septic infection. Mr. Banks misses this point altogether in his remarks; but his excellent tables show that certainly three, and probably the remaining two of his five fatal cases of

"very large herniæ," died of septic infection. Now it may not become the critic or brother surgeon to put down such fatalities to the operator instead of the operation; but the duty of the operator is to be perfectly frank to himself about them, and Mr. Banks should be asked whether he does not think that all the five cases just mentioned would not have been saved by more vigilant antiseptic precautions. He is a most honest and straight forward writer and will take this question in good part.

It is noteworthy that of these five fatalities the first and second, and also the third and fourth, occurred consecutively, and the dates of these two couples coincide with those of the only two complete failures recorded in table 1, (of 5 herniæ of moderate size). Now, there is good reason to believe that suppuration tends to cause failure.

Did cases 20 and 45 in table 1 suppurate?

The facts as they stand suggest some accidental event at those dates. Many such occur in practice. As an example may be quoted the surgeon's being compelled by ill health, or other cause, to leave the after-treatment too much to subordinates, who, in the present state of surgical education, have often about as much real proficiency in the practice of antiseptic surgery as they would have of playing the violin, or painting in oils, after merely hearing a course of lectures on the fine arts. I only give this as one example, out of many, of the way in which operations become dangerous which ought to be, and let us hope will be, made safe.

Among the 68 cases without strangulation there were two fatalities. One was that of a weakly child, and the other patient suffered from locomotor ataxy. Other papers in the series under notice furnish facts which seem to point to open operations for radical cure of inguinal hernia being more dangerous in children than adults.

Mr. Banks appears, at first sight, to have had unusual success with strangulated cases. Only three died out of thirty-eight. But these figures, and consequently the conclusions he draws from them lose value, because, as he tells us, they do not include "many" where the bowel being gangrenous, or the patient old and weak, with the hernia large, he did not tie the

sac, etc. Now, these are the very cases that furnish most of the fatalities in ordinary statistics.

As to the utility of the operation, 66 cases were followed up and of these, 44 were "completely successful from a curative point of view." Seven were "partially successful", *i. e.*, all the patients declared themselves benefited by the operation.

Mr. Banks sums up his general impressions as follows;

1. The prevalent notion that the wearing a well fitting and well-acting truss is a great burden is greatly exaggerated. After a time a man puts on his truss as he puts on his braces, and thinks very little about it, provided it does its work properly.

2. With regard to children, he thinks that operative procedures are very seldom indeed required. Of his own cases, only some four or five were done on children. He firmly believes that a well fitting truss, worn for a sufficiently long period, will cure the vast majority of herniæ in children. Of course, there are exceptional cases.

3. He thinks that operation may always be recommended, and even urged in cases of small femoral herniæ with adherent omentum.

4. The same rule applies to cases of inguinal herniæ, which are incapable of support on account of the pressure of adherent omentum, or which, by reason of their mere size, cannot be kept up, and so render the lives of the patients at once useless and unhappy.

5. No person should be subjected to operation who can wear with comfort a truss, which keeps his bowel securely in position.

6. Mr. Banks strongly recommends every body to wear a light support, even after the operation, not believing at all that this destroys adhesions. He found that in almost every instance of failure the patient, feeling confident in his cure, had omitted to wear a support, or else it got broken, and poverty and carelessness prevented the obtaining of another.

It should be noted that the majority of Mr. Banks cases were examined and their condition noted from three to five years after operation. The first is dated Jan., 1880.

He considers that, strictly speaking, there is no such thing

as a radical cure of hernia. "The main reason is that a man who gets a rupture has naturally a weak and yielding canal or ring, and when you have patched him you can only put him in the same position he was in before the rupture, because he will still be a man with a weak condition of his abdominal wall."

In connection with this opinion it may be pointed out that not one of the above six "general impressions" as Mr. Banks calls them, can be deductions from the facts he gives in his paper.

The reader is left to analyze and study these said facts, and draw from them his own conclusions. This mode of constructing a paper is far from being a praiseworthy one. One evil of it is that the reader who does not detect it, may be misled into attaching to Mr. Banks's "impressions" the value which is justly due only to his experience. There is internal evidence in the paper to show that he had all these "impressions" before he had any experience at all. Curiously also, all the six are opinions on questions which are only secondarily affected by operative experience, for what does this affect the value of trusses, the prognosis of children's herniæ *not* operated on, the dangerous character of femoral herniæ left alone, etc.?

The peculiarity we have just pointed out is probably due to the fact that the paper represents an address limited to a short time for its delivery, but required to open a full debate on a very extensive subject.

To return to Mr. Banks' opinions. He says "Does not the operation close the inguinal ring? I say most distinctly, no. All parings and scrapings and freshenings of the inguinal canal I hold to be utter nonsense and quite theoretical. When an inguinal hernia is big enough to warrant an operation, there is uncommonly little canal or ring left. I have generally found a big hole with a thin edged margin, which has taken three or four fingers of an assistant to plug up, while the sac was being removed. Then what is the use of pulling the pillars together by sutures? I do it simply with the object of holding the parts together temporarily while the wound heals, so as to prevent all danger from coughing, or straining, because in very big operations I leave the wounds quite open."

Professor Macewen being also one of the surgeons invited to open the discussion on The Radical Cure of Hernia, at the Dublin meeting of the British Medical Association, preferred "to give a demonstration of an operation for the radical cure of hernia, which had been performed by him frequently during the last ten years, and which had been recently published in the *ANNALS OF SURGERY*, August, 1886."

It is, therefore, unnecessary to give in this journal an account of Prof. Macewen's demonstration. It will suffice to recall that the special feature of the operation in question is the treatment of the sac. This, instead of being removed, is preserved. It is completely returned beyond the limits of the canal, and formed into a pad, which is placed on the abdominal aspect of the circumference of the internal ring.

In dealing afterwards with the walls of the canal, the author points out that there are two objectionable points which ought to be obviated. First, the stitch through the conjoint tendon is single, and includes the external oblique, therefore, the apposition of the internal with the outer pillar is not so extensive or so exact as it would be were a double suture placed in the conjoint tendon. Secondly, the conjoint tendon is approximated to the outer pillar of the external ring, the abdominal wall being thinned thereby, and the natural valve which the canal forms is, to a great extent obliterated. Instead, one ought to endeavor to bring the conjoint tendon into close proximity with that portion of Poupart's ligament on the level of the lowest part of the internal opening, and above by the transversalis and internal oblique muscles, at a point corresponding to the highest level of the internal ring, the aim being to carry the conjoint tendon outwards towards the fixed unyielding ligament of Poupart, and to unite with the transversalis and internal oblique muscles.

To judge of the care and finish with which this form of operation has been worked out in every detail, inclusive of after-treatment, the author's account must itself be read. The results are very extraordinary. The operation has been performed in sixty-five cases of inguinal hernia; and its principles have been applied in sixteen cases of femoral hernia,—making a total of eighty-one cases.

There have been no deaths, although twenty-nine of the cases were of strangulation.

Although forty cases were kept under observation over a year, (including some for two, three, four, and five years,) not one of these was otherwise than completely successful.

Other cases were followed for periods of eight months, and the like, with the same result.

The only known failure was an evident failure from the first, owing to an attack of acute meningitis which put the healing process in abeyance.

I do not know where else to find success recorded equal to this.

Sixteen of the eighty-one cases were under ten years of age. The great majority of the rest were adults.

The next paper read was that of Prof. Thornley Stoker. He protests against the use of silver wire altogether, and considers the approximation of the walls of the canal by sutures of any kind a matter of relative unimportance. "The best and most permanent closure depends on the exudation and organization of lymph, and the consequent consolidation and drawing together of the parts, assisted by such a plug as the twisted sac is capable of affording," *i. e.* by the method of Dr. Ball.

Such is Mr. Stoker's belief. His mode of operating does not materially differ from that of Dr. Ball, to whom he gives the credit of it. The former goes on to say,—“I have found great advantage in dealing with the sac after this method; it forms a better, more easily treated and more appropriate plug than invaginated tissue; it fills the canal completely, and by virtue of its attachments to the walls, draws them together when twisted, instead of forcing them apart as invaginated tissue must. With a view to close the boundaries of the canal, I prefer not to separate the sac from the deep portion of the canal. The peritoneum, in the bulk of cases, is practically not opened, as the ligatures which surround the sac are applied before it is divided. The risk of peritonitis is, therefore, small.”

These remarks will have to be considered in attempting to estimate the value of the procedure they are intended to support, of which it will be better to give a description taken from the account given by its inventor, Dr. C. B. Ball, himself.

1. The sac must be completely and very thoroughly isolated. The separation must be carried up right to the internal abdominal ring, and the peritoneum loosened from its attachments for a little distance from that opening, (as in Macewen's operation).

2. Emptiness of the sac must be assured, by opening it if necessary. Then its neck is to be grasped with "broad-catch forceps," (which are something like Thorton's, T shaped forceps used in ovariectomy) and gradually twisted up. Usually "four to five complete revolutions are sufficient, but this, in a great measure depends on the thickness of the sac, and the portion of it to which the torsion forceps is applied; the twisting should be continued until it is felt to be quite tight, and that any further torsion would produce rupture.

4. The torsion forceps is now transferred to an assistant, who is to maintain the twist; a stout catgut ligature is placed around the twisted sac as high up as possible, tied tightly, and the ends cut off short.

4. Two sutures of strong aseptic silk are now passed through the skin at a distance of about an inch from the outer margin of the wound, through the outer pillar of the ring, through the twisted sac in front of the catgut suture, and then through the inner pillar of the ring and skin upon the inside. These sutures prevent the sac from untwisting, and it is now cut off in front of them. A catgut drain is brought out of a separate opening at the back of the scrotum, and the two sutures are closed over lead plates, which lie at right angles to the wound. "Dry dressings are employed, retained by a double spica bandage, which is painted over with a solution of silicate of potash."

Studies on the dead subject show that "the peritoneum is thrown into a number of spiral folds radiating from the internal abdominal ring in all directions. These extended for a distance of over four inches, and in two instances were observed to pass over the internal abdominal ring of the opposite side. The entire length of the inguinal canal was occupied by the twisted sac, which completely filled it, and the sides of the inguinal canal were closely approximated. There was no depression

at the internal abdominal ring; indeed, this portion was more prominent than the rest of the peritoneum in the neighborhood. This can readily be understood from the way in which the final sutures are passed, which have the effect of pressing back the twisted cord towards the abdominal cavity."

With regard to the results, Dr. Ball has performed the operation, himself, twenty-two times without a death, and has not heard of any fatality from it in the practice of other surgeons.

With one exception, all the above (twenty-two) cases have been kept under observation, and in three only is it necessary to wear a truss in consequence of slight bulging, during coughing, at the inguinal ring, but in no case has a hernia of any size developed, and the remaining cases are, so far, absolutely well.

Two or three cases have been observed in which twisting the sac on one side cured a bubonocoele on the other side, proving the far reaching effect of torsion.

No details either tabulated or otherwise are given of Dr. Ball's cases.

Mr. Arthur Barker, of University College Hospital, London, entitles his paper "On Thirty-five Operations for the Radical Cure of Hernia by Original Methods." He says that in all his cases trusses were either inapplicable or ineffective. None of the cases under consideration were strangulated.

The thirty-five operations were done on twenty-nine individuals, of whom three had herniæ on both sides, and three required a second operation on account of return of the rupture.

There were twelve congenital, and fifteen acquired inguinal herniæ, one femoral and three umbilical. Among the inguinal were one or two in which the cæcum was prolapsed into the sac. Twenty of the patients were under ten years of age, and the remaining nine were over twenty. One was four months old, and one seventy years.

In one of the inguinal cases, Dr. Macewen's method was applied. The remainder were treated as follows:

Hard twisted silk was used to close the abdominal opening in all cases but two. In these two exceptions, the herniæ rap-

idly returned. A good deal of tissue is enclosed within the loops, and the latter are not drawn tightly.

The neck of the sac is cleared all round at the level of the external ring, and then ligatured after being opened to see that it is empty. The sac is then cut across half an inch below the point of ligature, and the scrotal part afterwards left to take care of itself. "One of the threads hanging from the stump of the neck of the sac is now threaded in a Liston's needle and the latter is passed up the inguinal canal in front of the vas, guided by the left index finger, which pushes the stump of the sac before it and feels for the inner aspect of the abdominal opening, that is, the internal ring. Here the needle is forced through one border of the ring and out through the external oblique muscle. It is then unthreaded and withdrawn, and is again filled with the other thread hanging from the stump of the sac. This is now carried in the same way as the first up the inguinal canal through the border of the opening opposite to that in which its fellow already lies, and through the external oblique as before. Both threads being now pulled upon, the stump of the sac is drawn well within the abdomen, and when the threads are knotted securely the first step, namely, that of closing the internal ring is complete.

The reader will notice that no pains are taken either to separate the neck of the sac from the walls of the canal, or the tissues of the cord from the neck of the sac. The knot on the lower end of the latter is simply dragged up into the neighborhood of the internal ring, and the cord left to take care of itself.

Then the walls of the canal are brought together by several silk sutures, (from four to seven).

All drainage is said to be unnecessary "in almost all these cases" if the wound is completely dried, up to the moment of closure, and is well padded with antiseptic wool from the first.

As regards duration of results, twenty out of the twenty-nine patients have presented themselves recently for examination and one has been heard of through competent observers. Of these twenty, three were quite well twenty months after operation, seven between twelve and fifteen months, and four between six and twelve months.

In a later note (dated November, 1887) it is added that six other operations have been done by the author, of which five healed by the first intention, and one suppurated; also, that two of the remaining cases had turned out to be failures.

Mr. Kendal Franks, like the preceding author, urges the importance of perfect asepticism. He also thinks that the use of a truss after operation is calculated by its pressure to cause absorption of lymph, and consequent harm. With regard to ultimate results, the majority of his twenty-four cases appear to have been completely successful.

He describes one interesting case in which, twelve months after operation, a small hernial protrusion appeared *near, not at* the site of operation.

I can add to this a precisely similar case which came under my own observation. My patient had previously been the subject of Fitzgerald's operation, and I suspect that the tiny aperture through which the new hernia appeared had been caused by either the cutting or the dragging of the gold wire left in.

Mr. Franks was almost the only contributor to this debate who, referring to the indications for or against operation, appeared to remember that one individual's case may differ from that of another for reasons connected with occupation, disposition, age and the like. As also reminded his hearers of the dangers of leaving a hernia alone.

With regard to operative details, he makes the skin incision on a higher level than, but parallel to the inguinal canal, so that when the operation is completed, the skin wound may not correspond with the situation of the wire sutures, and so that it may be further removed from sources of infection.

I myself advocated a similar plan, for similar reasons, a year or two ago in the *British Medical Journal*. It is plain, however, from the context, that Mr. Franks came to the same conclusions independently.

He clears the canal and both rings carefully. "In some recent herniæ, especially of smaller size, the sac and its contents may have slipped back into the abdomen. "In such cases I am satisfied to leave them there, and merely to close the rings

and canal. Some of my best results may have followed this method."

There is one curious detail in Mr. Franks mode of operating, namely, the fixation of the ligatured stump of the sac *between* "the pillars" of the internal ring. This he does with a suture of silver wire.

This mode of obliterating, or attempting to obliterate, if we so regard it, the original canal cannot be clearly described in abstract. Three silver sutures are placed. His description and justification are to be found in the *British Medical Journal* for Dec. 3, 1887, p. 1203.

In closing the wound he always uses buried sutures.

Dr. Rabagliati, of Bradford, England, related how his results with respect to strangulated hernia had improved since he adopted the plan of excising the sac and sewing up its neck.

Dr. Francis T. Heuston, of Dublin, read a case of femoral hernia in which the right Fallopian tube was strangulated and gangrenous. He removed the tube and the ovary, which was also in the sac. He remarks, "it is sufficiently rare to find the Fallopian tube and ovary within hernial sacs, to allow of another case being recorded; as I find in 1871 there were only thirty-eight cases recorded, namely, twenty-seven inguinal, nine femoral, one sciatic and one obturator. Of these, however, seventeen were congenital, all of which were inguinal, and the ovary alone was usually in acquired herniæ, while only five of the cases contained intestine." The following sentence, referring to Dr. Heuston's case is instructive. "The sac was (when opened) seen to contain a loop of intestine, which was returned readily within the abdomen, when another structure came into view, occupying the deeper portion of the sac, which was at first thought to be the vermiform appendix, but, on further examination, was found to be the Fallopian tube in a gangrenous condition," etc. Dr. Heuston twists the sac, uses chromic gut, and unites the deeper structures, in consecutive order with buried sutures.

In the discussion on the above papers, Mr. Walsham said he always practised "Banks' operation" and had found it very successful. He tied with kangaroo tail tendon, which, when

securely knotted, he preferred to both wire and silk. He thought the after-wearing a truss calculated to cause absorption of lymph. Mr. Thomson supported Dr. Ball's plan. Mr. Wheeler practised "the dissecting operation with success, using catgut for children, and silk for adults. He used a pad and no truss in the after-treatment. Dr. Ward Cousins was the only surgeon present who warmly advocated operation on young children. He said that, of fifty on whom he had operated, thirty remained well after twelve months. He had only operated on ten adults. Professor Kocher, of Berne, agreed with Mr. Mitchell Banks that we ought to distinguish between large and small herniæ. Failure after operation on the smaller was really a failure of expectant treatment kept up too long. He preferred silk or wire to catgut.

Mr. C. B. Keetley said that when the arrangement was made by which he was to be one of the speakers to open the debate, it was, he suspected, in order that there might be someone present to deal with the treatment of hernia by injection of the canal. At the Cardiff meeting he had described the method and immediate results. He would now report how far those results had been lasting or otherwise.

Confining himself to *operations by injection done over a year and a half ago* he had evidence of the present state of these in the case of eleven operations done on nine patients. Four patients, representing five herniæ, state themselves to be cured. He had recently seen two of the patients, *i. e.*, three herniæ, and found the cure to be real and absolute. Over two years had elapsed since two of these operations. One patient is probably cured, but has continuously worn a truss which she now wishes to leave off. Three of the patients, in whom four herniæ were operated, have received no benefit as far as he could tell, but, curiously enough, are thought by themselves to be better. One of these failures was injected with absolute alcohol only, and not with the oak bark decoction. Of the remaining three patients, it had not yet been possible to learn anything, they having left their old addresses. Most of the patients discarded trusses within two or three months of operation. One case suppurated, namely the one who now describes himself as "nearly recovered."

The mode of operating had been described in the *British Medical Journal* (Vol. ii, 1885, p. 443).

Perhaps failure may sometimes be caused by (1) not using enough of the injection. (2) by not getting it really into the canal, and (3) by the fluid's gravitating, or otherwise escaping, out of the canal. The writer had seen an operator invaginate the external spermatic fascia before the nozzle of his syringe instead of piercing it.

He remarks, "while I believe the operation to be by far the safest and easiest form of operation there is for a surgeon of moderate experience and skill, I see clearly enough that for certainty of result it cannot compare to operations involving mechanical interference with the sac and canal, and I believe the latter to be safe enough in the hands of a few surgeons, but only a few. If I suffered from hernia myself, I would not let anyone try his prentice hand on the sac of my own hernia and the walls of its canal." The dangers of operations in which the sac is interfered with, are only reduced to insignificance when there is found an operator of considerable experience in dealing with herniæ, thoroughly practiced and qualified in antiseptic surgery, and who, moreover, can always keep a cool head and tell when to stop.

One point in Mr. Keetley's paper was the recommendation that all stout patients with rupture should be urged to adopt a modified Banting system of diet. Abstinence from starches and sugars gives astonishing relief to many fat people who cannot or will not have their herniæ directly interfered with.

SUPPLEMENTARY COMMENTS ON QUESTIONS RAISED IN THE ABOVE DISCUSSION.

With regard to the primary question as to what *persons* were suitable for operation, no speaker contributed anything more valuable than a statement of impressions. Mr. Banks was greatly opposed to operating on children. Mr. Cousins operated on scarcely any other class. Who has any right to blame the latter for having an exceptional opinion? He has as much right to be guided by his own impressions as other people's. What are wanted are facts. Some may be collated from the details given in the course of debate. These point to the probability that suppuration is more common in

children operated on for radical cure than in adults, *e. g.*, two of the three cases given by Mr. Stoker were children. Both suppurated; one died "soon afterward," of tubercular meningitis.

In the other, *æt.* 3 years, urine got into the wound on the second day. "A slight fulness, threatening a return of the rupture, showed itself six months afterwards," and required the application of a truss.

The third case, an adult, did not suppurate, although an operation for varicocele had previously caused free suppuration in this same patient.

Again, in case thirty-three of Prof. Macewen's, a child of 5, "urine saturated dressings, temperature increased and slight suppuration."

Mr. Banks only operated on three children under 10. One of the three, *æt.* 2 years, "died in seven hours from shock." Operation very prolonged owing to extensive adhesion of bowel to sac." Now cases in which this occurs are not very exceptional.

I can add to this my own experience. The only patients I have lost after excision of the sac (except strangulated cases) have been infants.

It is far more difficult to get a surgical nurse competent to attend young children than to deal with adults. And the difficulty the surgeon has in keeping the dressings dry and snug must be known to everyone.

It will have been noted that even of the fifty children operated on by Mr. Ward Cousins, twenty had proved failures before a year elapsed.

Next with regard to *the chances a child has of radical cure by truss-treatment*. I can make this contribution to an answer to that question, if, in a long series of adult patients who come for trusses, all are asked at what age their rupture began, only a minute proportion will reply "in infancy." One of my patients who had a congenital inguinal hernia in infancy and who had recovered, developed a hernia in the same region when adult; but the new hernia could not be congenital, because he had a large hydrocele of the tunica vaginalis lying behind it.

Mr. Banks says there is *no such thing as a genuine radical cure*. That is perhaps mainly a question of words. But is he right in asserting that to have once had a rupture implies a naturally weak and yielding canal or ring?

Now the proportion of people with rupture increases with age so that in very advanced life, one person out of three is ruptured. If the span of human life were longer, would not almost everyone be ruptured who survived well into the second century? Mr. Banks would perhaps say that age brings the weakness. Very well then, no operation can prevent any man from growing old, so perhaps we ought all to wear trusses.

Let anyone carefully review the facts contained in papers, like, *e. g.*, Dr. Macewen's, and then ask himself which is misleading—the term “Radical Cure of Hernia” or Mr. Banks' condemnation of it?

With regard to the use of *silver or gold wire*, surely it *must* tend to cut and damage the inguinal pillars. If ever there was a fair *a priori* argument, this is one. And it is supported by cases like those of Mr. Kendal Franks and my own mentioned above, in which new herniæ appeared coming through fresh hernial apertures in the pillars after the insertion of such wires. From the antiseptic point of view, they, on the one hand, form no nidus for germs as animal ligatures do in cases which suppurate. On the other hand they form a greater obstruction to the escape of deep pus in such cases.

Bronchitis is plainly a danger specially associated with operations for radical cure, especially in the old and fat.

Is it advantageous or injurious to plug the canal with the stump of the sac? Several of the above surgeons advocate this. None of them have got results equal to Macewen who reduces it. It seems to me a plan open to the greatest objections. It must make abrasion of the walls of the canal impossible, it must leave a wedge ready to lead the way down when a new rupture tends to come. It seems to me only a shade better than the vain practice of ligaturing a stump of omentum in the neck of the sac.

The question of the *truss in after-treatment* has already been partly dealt with, but it should be added that most of those

who believe a truss can only do harm by causing absorption of lymph, use a pad and bandage instead. Now what are a pad and bandage but an inelastic and ill-fitting form of truss? Surely, also, if the walls of the canal adhere together at all, they must do so in the same way as all other raw surfaces do, *e. g.*, the flaps of an amputation stump. Would pressure cause such flaps to separate after once uniting? Now there are no carefully observed, weighed and numbered facts bearing on this question, but surely the probabilities are entirely in favor of a truss being after, as it certainly is before, an operation, calculated to favor the radical cure.

In reading of *Dr. Ball's torsion plan*, it really seems difficult to see why what can be done with it cannot be done nearly if not quite as well without it. At all events the neck of the sac can be closed at the highest desirable point without it. In inguinal herniæ the ligature can be applied as high as the cord can be separated. Any higher action either by ligature or torsion would seem to me dangerous to cord and testicle and it is not without astonishment that one sees no reference to this point by any of the Dublin surgeons.

Moreover, without any torsion, a large extent of the parietal peritoneum can be pulled into the canal, I will venture to think, in any case in which it would be justifiable to twist it. I have myself pulled a part of a well marked urachus (obliterated) from the middle line into the sac of an inguinal hernia.

It is in inguinal herniæ that Dr. Ball's plan seems to me at first sight not a good one. Taking the hint from him I have several times twisted the sac in umbilical herniæ. But, instead of tying and excising it, I have reduced it *en masse* between the parietal peritoneum and linea alba, closing the freed aponeurotic aperture with hare-lip pins.

The very existence of such a thing as the radical cure of hernia by injection is ignored by all the writers but one. Nevertheless a considerable proportion of the cases in which suppuration and even death followed excision of the sac might have been operated on by injection with safety and with every prospect of success. Surely every surgeon who pretends to attempt the radical cure of an affection which, like hernia, presents itself in a multiplicity of different forms, degrees, and

aspects, ought to make himself practically familiar with the various different modes of operating on it which have proved successful, and more especially with a mode which is both easy and harmless.

LAPAROTOMY FOR INFLAMMATION OF THE VERMIFORM APPENDIX WITH ULCERATIVE PERFORATION, FOLLOWED BY RECOVERY.

By ARCHIBALD DIXON, M. D.,

OF HENDERSON, KY.

ON January 23, 1888, P.H.B., a lawyer, æt. 35, consulted me for pain in the lower portion of the abdomen, accentuated over the cæcal region. Palpation revealed a fulness with slight induration over the colon, but no tumor, and as there had been constipation, more or less pronounced, for some time previously, partial impaction was diagnosticated. Hot fomentations, castor oil and large enemata were prescribed, with improvement so marked that, on the 27th the patient was dismissed, with a special injunction to remain quiet until all trace of tenderness in the iliac region had disappeared. On February 1, four days later, I was again called and found the previous symptoms aggravated—patient had been up and walking about—there was tenderness over the cæcum; with induration not specially marked, pain radiating over right side of abdomen. Temperature, 99°. Perityphlitis was undoubtedly present. Hot fomentations were again ordered. Iodine as a counter-irritant, was applied, and as the bowels had been freely moved, morphia, $\frac{1}{3}$ gr. was given hypodermatically and ordered to be continued sufficiently often to control pain and promote quiet. Diet to consist of milk. The succeeding five or six days were marked by no special change in the condition of things, save that the induration had increased to some extent, as had also the tenderness. Temperature, 100°. There was dorsal decubitus with flexion of the right thigh, fluctuation could not

be made out, nor did rectal examination reveal any induration on the right side of the floor of the pelvis, although an abnormal tenderness was manifest; bowels had moved once or twice without the aid of enema or cathartic. During my visit on the 7th, the patient complained of being chilly, and stated that he had had one or two slight rigors the night before. Temperature was still, however, not above 100° , and the pain and tenderness had rather decreased. Quinia, in 5 grain doses was ordered night and morning.

The morning of the 10th, found my patient nervous: there was increased tenderness in the iliac region, the tenderness extending over the belly nearly as high as the umbilicus, but confined to the right side. Severe pain extended down the cord into the right testicle. Temperature 102° , tongue covered with brownish coating, breath bad and an anxious countenance. Fluctuation could not be made out by palpation: in fact the tenderness was so marked that very little effort could be made in that direction. There was distinct induration in the right floor of the pelvis, as ascertained by rectal examination, but no fluctuation. Vesical irritation was present with slight tenesmus, there being frequent calls to empty the bladder with increased quantity of urine. I explained to the patient that there was, in all probability, an abscess too deep for fluctuation to be made out. The danger of his condition was laid before him, and the importance of surgical interference for his relief dwelt upon. Being a very intelligent man he readily comprehended the situation, and consented that an operation be done. The afternoon of the same day, under the usual antiseptic precautions, abdominal section was made. An abscess extending deep down into the fossa and behind the cæcum was reached. When the abscess wall was incised there was an escape of foul gas followed by about a pint or more of feculent pus with a strong fecal odor. The cavity was irrigated with a 1 in 1000 sublimate solution and sponged out: the appendix was found with an ulcerative perforation about an inch and a half from the colon. Following the plan advised by Greig Smith, *Abdom. Surg.*, p. 443, the appendix was ligated with catgut close to the cæcum, drawn just tight enough for occlusion and the ulcerated portion cut off. The cut end was washed

in a sublimate solution, and the serous coat brought over the mucous coat by fine catgut Lembert sutures. Iodoform was dusted over the abscess cavity after again sponging it out. The abdominal wound was then closed around a large drainage tube, the whole being covered by sublimate gauze.

The patient came from under the influence of chloroform with but little evidence of shock: hemorrhage had been slight and was easily controlled by forcipressure. Half a grain of morphia was given hypodermatically which induced sleep, and six hours later I found my patient, as he expressed it, feeling a hundred per cent better in every way, he had taken a milk toddy and his temperature was 99° . The abscess cavity was irrigated daily with a sublimate solution through the tube, which was removed on the 17th, seven days after the operation. Convalescence was uninterrupted, and the patient discharged on the 23d, abdominal wound almost entirely closed.

REMARKS.

The foregoing case certainly was very different in its symptoms, course, etc., from what I had been taught in regard to inflammation, ulceration, and perforation of the appendix vermiformis, and this has led me to ask: Are not the majority of cases of perityphlitis either due to, or accompanied by, appendicitis either simple, catarrhal, or ulcerative? Previous to this three cases have fallen under my observation, which had been diagnosed as perityphlitis, each accompanied by tumor, pain and tenderness in the iliac region, all terminating fatally, one from septic fever, after operation, the other two from general peritonitis from rupture of abscess sac into the peritoneal cavity. In the first case death took place twenty-one days after operation (before the days of antiseptis); the second case fourteen days from the beginning of the attack, and the third seventeen days after, both having refused operation. In each of these cases autopsy showed that ulceration and perforation had taken place in the appendix. In the case under consideration the diagnosis of fecal impaction was first made, and undoubtedly there was impaction, which was relieved by large enemas and catharsis and, had the patient obeyed orders as to

maintaining perfect quiet until all trace of tenderness over the cæcum had subsided, he might perhaps have escaped the trouble which followed.

The symptoms in the case at no time pointed towards perforation of the appendix, unless the sharp pain extending from the abdomen down the cord into the right testicle, which began on the day before the operation, and a frequent desire to urinate may have indicated it. Pain from the first was not severe, there was no nausea or vomiting, no evidence of collapse, and the elevation of temperature at no time exceeded 102° . It is true there was present, at times, extreme tenderness on palpation, dorsal decubitus with the right thigh flexed, constipation with a feeling of fulness and induration, all of which are present in peri-cæcal cellulitis, and appendicitis was not suspected until the operation revealed it.

I am further supported in this view by Dr. Robert F. Weir, who, in a recent letter to the *Medical News*, speaking of the views of Dr. Pepper, as expressed before the Philadelphia County Medical Society, in the discussion on pericæcal inflammation, says: "With such cases Dr. Pepper further remarks considerable impaction of feces exists, and in so far he is in accord with Kraussold, who considers such inflammation rarely, if ever, to progress to suppuration unless a perforation exists. And this is the view that the surgical profession is gradually but strongly leaning to. It is supported in this tendency by ever increasing evidence, showing more and more clearly the rarity of cæcal perforations and the frequency of appendicitis, simple or perforative, as the origin of abscesses occurring in the right iliac fossa. Even in the slowly progressing forms of suppuration, such as are described by several of the gentlemen participating in the discussion alluded to above, it can be proved by a glance at the series of 100 cases of perityphlitic abscesses undergoing operation, that were diligently collected by Dr. Noyes in 1882,¹ that a majority of these distinctly gave proof of their cause being a perforated intestine. Out of the total 100 cases, in 40 were recognized fæces, fæcal concretions or foreign bodies originally lodged in

¹Transactions of Rhode Island Medical Society, 1886.

the intestine, and in 14 others gas in marked quantities was observed, while in 45 only pus was seen in various stages of foulness. Matterstock, likewise, in 146 cases of perityphlitic abscesses found fæcal concretions 63 times. Dr. Weir further says: "Such testimony is corroborated largely by everyone who has frequently operated for perityphlitic abscesses and individually, I have felt it a strong argument in favor of an early surgical interference in these cases, believing, as I do, that a *perforated* appendix is generally the starting place of the abscess. The latter may take place outside of the peritoneum by adhesion of the appendix, formed with the parietal peritoneum then, or at a previous slight attack of appendicitis, or it can occur among the adjacent intestines matted together by protective limiting adhesions, thus giving rise to a veritable intra-peritoneal abscess scarcely to be distinguished from the former, or finally, the fæcal extravasation may spread widely and beget a fulminating general peritonitis."

The question of treatment in peri-typhlitis, typhlitis and para-typhlitis is one of exceeding interest, and upon it may depend the life or death of the patient. In cases of fæcal impaction in the cæcal region—the most favorite seat—there can be no question as to the propriety of using large enemata of warm water, glycerine, castor oil, etc., and the internal administration of cathartics, the best being, perhaps, castor oil. In peri-cæcal cellulitis, notwithstanding the advocacy of salines to prevent (?) peritonitis, nothing has succeeded so well in my hands as perfect rest both of body and mind, which implies an absolute avoidance of cathartics, the hypodermatic use of morphia, counter-irritation and the application of heat or cold in the shape of fomentations, etc., and the ice-bag. Under this treatment with an occasional mercurial a number of cases under my care have terminated in resolution and recovery. If resolution does not take place, if the febrile condition remains and the pain and induration extend, operation is imperative. No other course is left open save to take the chances of the abscess becoming encysted, or of its rupturing into some channel other than the peritoneal cavity. The use of the exploring needle for the diagnosis of pus I cannot think good surgery. There are usually symptoms present which

point directly to the formation of pus, rigors, increased elevation of temperature, anxious countenance, etc.; and if the aspirating needle fail to find pus, there can be no certainty that it does not exist, either behind the cæcum or deep down in the pelvic cavity. Moreover, it is an unsafe procedure from an antiseptic standpoint, it being an extremely difficult matter to render an exploring needle aseptic. Exploratory incision is to my mind a much better and safer method: it does not prejudice the case, and if pus is not found and still be present, it will almost certainly, following the course of least resistance, make its way to the opening and be discharged externally. In perityphlitis rectal examination is often barren of results, but in typhlitis and para-typhlitis, it is of perhaps more value than any one other diagnostic procedure, for here the induration and tumefaction is deep down, extending into the floor of the pelvis on the right side, where it can usually be made out, and when found, points unerringly to surgical interference. In cases of appendicitis, cæcitis, with perforation followed by a fulminant general peritonitis, operation is demanded at once; there can be no other hope, and slight as it is, the patient should be given the benefit of it. In regard to the treatment of the perforated appendix after abdominal section, I fully agree with Greig Smith that it is a waste of time to try to close the perforation; the simplest, quickest, and safest plan is, obviously, removal of the useless and dangerous appendix.

I am indebted to Dr. John Young Brown for valuable assistance.

EDITORIAL ARTICLES.

THE FRENCH CONGRESS OF SURGERY AND THE RADICAL CURE OF HERNIA.

The value of the radical cure of hernia estimated by its ultimate results was the subject of an important debate at the recent French Congress of Surgery.¹

The debate was opened by M. Socin, of Bâle, who spoke strongly in favor of the view that the results deserved to be regarded as a real and genuine cure. He had done the operation 75 times in cases without strangulation, and 85 times in cases in which strangulation existed. The first category gave 2 deaths, the second 11.

Of the 147 survivors, M. Socin had seen 133 some time after the operation, some after only one year, some after nine years. Of the 133, 83 remained completely cured. As to the others, if they were not cured completely they were greatly benefited.

As to the indications for the operation he believed it ought to be done on all strangulation cases except those in which the intestine could not or ought not to be reduced.

He employs antiseptic methods in the utmost strictness. He is careful to disinfect even the intestine before returning it.

So highly does he think of the results that he regards it as a positive misfortune to the patient if his hernia happens to be reduced by the taxis.

The following he gives as the indications for attempting radical cure in non-strangulated cases: When in young subjects of either sex, the classical treatment by truss fails to keep the hernia reduced in an absolutely permanent manner, and in adults when the truss does not keep

¹Discussion at the French Congress of Surgery. *Le Bulletin Medical*, March 18, 1888.

up the hernia completely, easily and painlessly. The younger the patient and the smaller and more recent the hernia the greater the chances of success. He says that in young subjects hernia is always congenital, it depends on persistence of the tunica vaginalis in an open condition. Close it and the patient is put in a normal condition and his hernia in truth radically cured. In subjects less than 25 years old he had obtained a percentage of at least 62 of cures.

But above the age of 25 his complete cures equal only 42 per cent. The conditions are here very different. There may be lengthening of the mesentery, much obesity of the omentum, relaxation of the abdominal wall and rings, upon all which conditions the extirpation of the sac has no effect, at least directly. Double hernia or a family history of hernia diminishes the chance of cure. The use of a truss after operation is condemned.

With regard to the deaths in his non-strangulated cases, he says that one case was that of a female of 54 with a large crural hernia. Its size was that of an adult's head. The chafed and attenuated skin threatened to mortify, and he resected 34 square centimeters of it. The sac contained a litre of fluid. The second case was that of a man, aged 42. There had been symptoms of strangulation and reduction had been effected by taxis. A large piece of omentum had to be removed.

M. Socin then draws the following conclusions:

The operation is without danger except in (1) very old people, (2) when the hernia is very large, and the integument ulcerating, (3) when removal of a large portion of omentum is indispensable.

Now this conclusion is not strictly warranted, and I must again protest, as I have often done before, against authors, laying down the law in regard to radical cure of hernia from their own individual experience. It is quite unnecessary, because there are excellent and honest surgeons in every country now recording their observations. It is, moreover, not right for any surgeon to assume that, even after operating on over a hundred cases, he has, in his own personal experience, exhausted the possible or even likely forms of danger.

If I were to judge by my own personal experience alone, I should

say that the operation for radical cure of hernia by excision of the sac is more dangerous in infants with small herniæ than in patients of 40 or 50 with large ones, and I have heard of cases in the practice of other surgeons which confirm this view. It is certainly easier to insure strict asepticism in the latter than in the former class of cases.

Another observation may be made appropriately here, which was called forth by the discussion at Dublin, noticed on another page of this journal, and, indeed, applies to nine out of ten papers on the subject. Each surgeon speaks and writes as if there were no other mode of attempting the radical cure of hernia than that with which he is himself familiar, or if he does recognize any variety, it is only to call attention to some modification of detail which he has made or thinks he has made himself.

It must be obvious that the expression of strong general opinions, sweeping statements of laws on the subject are out of place in such papers.

Macewen's operation, Ball's operation and injection methods are ignored throughout this debate

To return to M. Socin. He formulates the operation he practises as follows: "The operation consists in total removal of the sac up to above its neck. Suture of the pillars is only exceptionally necessary. In congenital herniæ, the dissection of the hernial sac may offer difficulties, nevertheless it succeeds in the great majority of cases. The lower part may be preserved to act as a tunica vaginalis testis. When there is ectopy with atrophy of the glandular tissue, the testicle ought to be removed with the sac.

M. THIRIAR, of Brussels, who follows minutely the procedure of M. Lucas Championnière, described in the *ANNALS OF SURGERY* for October, 1887, p. 356, has operated 21 times and had one death attributable to the operation, viz., that of a patient, 64 years old, attacked on the sixteenth day by "alcoholic encephalitis."

M. Thiriar's operations are too recent to justify conclusions as to ultimate results.

M. LEONTE, of Bucharest, practices the following operation: He drags down the sac until its abdominal orifice is visible. Just above

this level he makes a circular incision with curved scissors or with a bistoury. The two serous borders formed by the cut immediately retract and leave exposed a surface of cellular tissue; the upper serous border has even a tendency to curl up. M. Leonte favors this tendency by pushing up and exposing the serous border in question.

The sac itself he scrapes internally. When it is already irritated, as in strangulated cases, he simply bathes it in strong carbolic solution, or in solution of zinc chloride.

He claims to have had seven successes in the seven cases in which he has employed the operation. In each union took place by the first intention.

He does not state what means he adopted to prevent the intestine, etc., from coming back into the sac before the union of its walls took place.

M. ROUTIER gives a very favorable account of the results attained by himself in 14 cases; 12 were inguinal, and he states that 5 contained the cæcum.

M. MOLLIERE, of Lyons, speaking of umbilical hernia, says that the umbilicus should be removed; otherwise, it is impossible to isolate the sac.

M. TRELAT condemns the term "radical cure of hernia," and suggests "operative" or "surgical" "cure." He is of opinion that the true conquest achieved by the "surgical cure" of herniæ is the simplification of adherent and complicated herniæ. M. Trelat, like the preceding speaker, considers the operation to be absolutely without danger. M. Trelat may be excused for thus speaking, because a short time ago he was a firm opponent of the operation, and now, of course, has naturally a convert's zeal. MM. Moliere and Trelat were followed by M. BOECKEL, of Strassburg, who bluntly stated that he had lost two patients out of twelve, and considered the results not very encouraging. One patient died of acute septicæmia with gangrene of the scrotum, the other of delirium tremens. It is not, however, quite clear whether these fatal cases were or were not suffering from strangulation when operated on. M. Boeckel prefers Lucas-Championniere's method.

M. LE DIBERDER, of Lorient, described an autopsy on a man cured by Gerdy's invagination method, and attributed the principal role in the occlusion of the hernial canal to cellulo-fatty growths. Fibro-fatty growths can be induced by various irritations, and this fact may be utilized.

M. LUCAS-CHAMPIONNIERE says that operations for radical cure performed after strangulation should not be taken into account. Of others he has now done 81. The two first date seven years ago. One has to wear a truss, but was not operated on with all the care he now finds necessary. He says that from the sixth week one can judge whether or not a real radical cure will be obtained.

With regard to mortality—he has lost the case he last operated on. This is an instructive case and corroborates my own experience that it is far from being so safe to operate on some classes of hernial cases in a private house as in a hospital. M. Lucas-Championniere's patient was emphysematous and had a very large hernia. The operation took two hours and ten minutes. Death occurred rapidly from pulmonary congestion.

With regard to the truss, it is indispensable when there is a large orifice. In other cases M. Lucas Championniere now condemns it, but uses a truss placed above the *trajet herniaire* which protects it against the pressure of the intestines.

With regard to indications for operating, he does not see why the simple desire to obtain a radical cure should not be considered sufficient. He considers congenital hernia to be an absolute indication, because of the integrity of the rest of the abdominal wall.

M. P. SEGOND did not agree with M. Lucas Championniere that the question of whether the surgical cure of herniæ was a radical cure or not was one merely of words. Nor did he agree that the association, for the purpose of studying the result, of the operation of radical cures done on cases of strangulation and non-strangulation, was in the least illegitimate.

Surely every one must agree with M. Segond and, further, to the independent reader it must seem scarcely fair for M. Lucas-Championniere not to give the statistics of his strangulation cases. It is bad

enough that writers and speakers on the radical cure should almost universally ignore everybody's work but their own; it is worse when they only tell you as much about the latter as they think good for you. Readers would rather know the facts and judge for themselves of their value.

M. Segond also administers a well deserved rebuke to the numerous surgeons who have recently been condemning, with a positiveness in exact but inverse proportion to total absence of facts in support of the theory, the wearing of trusses after operation. Among his 44 cases he has found a perfect result in all who had been careful to wear a truss after operation, and relapse in most of those who had not.

We are told that a truss must tend to cause absorption of the new material formed in the canal, of the cicatrix, etc. What then? Surely nobody pretends that the canal is blocked up by this cicatrix, or this effusion of plastic material. It may always be observed to grow less and less for some time after the operation, whether a truss be worn or not. This I have often noticed. And, on the other hand, how is any amount of pressure likely to abolish adhesions? Would continued pressure from the sides cause a cured hare lip to re-open? In short, no other facts nor *a priori* considerations seem to me to condemn the use of the truss after the operation for radical cure.

The whole of M. Segond's remarks are noteworthy for their moderation, good sense and freedom from prejudice. He is no alarmist, but he does not, in the face of facts undeniable, pretend that the operation for radical cure is a trivial affair and free from danger. He justly says that each case and each patient must be considered individually before a decision is come to. His method of operating is that which all Frenchmen now call that of M. Lucas-Championniere, namely, the high and thorough excision of the sac, with minute antiseptic precautions, etc. He questions whether some of the small herniæ, recent and in young subjects, cured without a truss being worn after operation, ever really required operation at all.

M. L. G. RICHELOT condemned all partial proceedings, *e. g.*, incomplete removal of the sac, suture of the pillars of the ring only, omental plugs, etc. He proposes a formal classification of herniæ into 1. simple. 2. complex, 3. herniæ of the old and cachectic. C. B. KEETLEY.

ASEPSIS IN ASEPTIC DRESSINGS.

The writer desires to show in the following remarks some of what he conceives to be flagrant dangers and mistakes that prevail in commerce, in the fabrication, transportation and dispensing of antiseptic wound-dressing material.

Hoping that the contrary is the case, it is conjectured that there is not an establishment in the world that puts on the market a package of aseptic (so-called) or antiseptic (so-called) gauze or cotton or catgut or silk, that the educated antiseptician could accept without a doubt as being *a priori* safe or in most cases up to the maker's representation. Nor are they, *perhaps*, tested by the severe etiquette of bacteriologic methods of investigation. For instance take "aseptic absorbent cotton;" it comes to the surgeon in packages of various bulks, done in paper envelope most often broken. Now the surgeon knows little of the method by which this cotton has been prepared. How does he know that the hands or machinery or water, etc., that fabricated it were of such a degree of cleanliness as to entitle the fabric to be labelled "aseptic" forsooth? It is transported in practically open boxes to its destination. What it may encounter in that passage in contagium and evil from air, from damp and neighboring freight, may be imagined. When the apothecary or dresser places it on dusty or dirty shelves (*i. e.* from an aseptic standpoint) or in damp and soiled drawers, how much of dangerous miscellaneous filth may it here assume? The apothecary often breaks and dispenses the package *ad libitum*. Next the doctor or surgeon has it, may be tearing off repeated pieces and using them on different kinds of wounds, possibly infected ones. The next case, say, is a parturient; all necessary care is taken otherwise, but unwittingly a piece of this now fatal cotton is used, and the mother possibly infected to a deadly septicæmia.

Should this be so? Should not the surgeon *know* whether this material had been baked or Pasteurized or not? Should it not be subjected in his hands or in the fabricator's, to the test of pure culture? Should it not be transported in a magazine that is essentially hermetic against the entrance of air, damp fluids or soil? This magazine should

be aseptic within and should be able to withstand from without the insults of passage and storage, and the mutations of the retailer and the ignorant. It should bear on its label a better voucher for sanctity, even than is required for vaccine virus. Briefly, it should be germane to all that constitutes prophylactic antisepsis of to-day. As the matter stands, one can go into any hovel, ask for a clean old towel, superheat a flat iron and with it re-iron and scorch the towel, and behold an aseptic dressing that will stand the test of pure culture better than any brand of so-called aseptic dressing that can be had from any retailer in the world.

Carbolized and sublimatized gauzes and dressings are, generally speaking, misnomers and deceptive. They doubtless were up to a certain standard when prepared, but owing to the volatility of the impregnating agents the gauze is often practically inert when it is used. Most of the sublimate gauze of commerce will not produce even so much as a mild dermatitis, though it be used with an hermetically covered bandage.

All that we have said of aseptic cotton, of magazine, envelope, etc., maintains here with equal force. But with this difference for the last, they should be so enclosed in the magazine, either with fixation agents or by the impermeable envelope or by both, that the material may retain its potentiality for months, and withstand all fluctuations of temperature, etc.

Undoubtedly some of the catgut of commerce is infected. We have seen suppuration from suture and ligature points in wounds, in which the technique, dressings, etc., seemed blameless. We have made control tests with it on dogs (sublimate technic, Scheuerlin's) with a like result, and with absorption of catgut.

In a wound or cicatrix that has had an absolutely faultless aseptic history, catgut possibly, is not absorbed or essentially metamorphosed; certainly not for months, perhaps years. Volkmann, reports a case of milzbrand infection from carbolized catgut, which had been in 20 per cent solution for months, proof in this case being *post hoc ergo propter hoc*.

Most of the powdered iodoform is not sufficiently attenuated to be

unirritating in the fresh wound and clogs any form of atomizer and in the provinces at least is adulterated.

The "isinglass court plaster," that is so in vogue with the laity and dillettante medicals, is a material most plenteously pregnant for evil. It furnishes an ideal atmosphere and pabulum for bacteria, and has sent many an unfortunate to the ground. It is questionable whether it can be disinfected so as to be safe. Phlegmon, pseudo and true erysipelas are its most usual companions. Its most frequent victim being the accommodating and officious person, (or his friends) who carries it about his person for emergencies, and who dispenses it with a "lick and a stick." General and practical directions for the performance of cauterization (*ferrum candens*) by way of warning, should accompany each packet of this universal poor man's surgical vade mecum.

A. R. JENKINS.

INDEX OF SURGICAL PROGRESS.

GENITO-URINARY ORGANS.

I. Clinical Contribution to the Surgery of the Kidney.
By DR. PAUL WAGNER (Leipzig). Publishes a number of cases of tumors of the kidney (malignant and non malignant) occurring in the clinic of Leipzig. The sarcomata and carcinomata occurred at the ages of 3, 4 and $5\frac{1}{2}$ years respectively. In the adult there is also a case of myxo-adenoma recorded. Three cases of hydro-nephrosis are also collected.

Among the conclusions the author points to the indication of nephrectomy in all those cases where the life of the individual alone is threatened. In this category we must, aside from traumatisms to the kidney, include malignant growths of the kidney. The results in these cases have been unfavorable on account of the advanced stage of the disease in which the operation was performed. Benign tumors demand the operation of nephrectomy if threatening symptoms appear. Tuberculosis of the kidney, if existing in the kidney alone, would belong to the class of operative cases. Calculi and suppurating processes should fall under the head of nephrolithotomy. If in these cases hectic and emaciation set in, nephrectomy is indicated. Hydro-nephrosis and cysts of the kidney do not call for nephrectomy. Floating kidneys with also cases of fistula of the ureters are to be treated conservatively. Floating kidneys the seat of morbid growths are to be extirpated. Nephrectomy should be when possible *extra-peritoneal*. Kidneys the seat of calculi or suppuration are best removed through the lumbar incision (Simon). Larger tumors are best removed by the method of von Bergmann. In all cases of nephrectomy it is advisable to determine if the patient have two kidneys, and if the remaining kidney be normal. In laparotomies (tumors) this is best done by pal-

pation or by the Gluck method. In women the catheterization of the ureters through the bladder may be attempted. In cases of calculi and suppurating kidneys an abdominal fistula may first be made and the urine of the bladder and fistula compared. In extra-peritoneal nephrectomy for tumors, abdominal incision or Simon's rectal exploration may be tried to determine the condition of the remaining kidney.—*Deutsch Zeitsch f. Chir.*, bd. xxiv ; hft. 5 and 6.

HENRY KOPLIK (New York).

II. On the Operative Treatment of Nephritic Calculi. By DR. E. HERCZEL (Heidelberg). The operation of nephrolithotomy was suggested by Czerny in 1880, and first performed by E. Norris the same year. However, in many cases, where nephrolithiasis has long existed, this operation will not suffice, and nephrectomy must be resorted to. After detailing six cases illustrative of this point—all occurring in last year's service—he arrives at the following conclusions:

1. In nephritic calculi pyelo- or nephro lithotomy is to be considered as soon as the failure of internal treatment is shown, or the symptoms become urgent. In favor of the operation is the good prognosis (26 definite cures and 3 deaths in the 29 cases known to him), further the preservation of the kidney parenchyma in the presence of possible like disease in the other kidney. It is almost certain that calculi in young persons, usually more movable and consisting of oxalate of lime and uric acid, cause specially severe effects and are well suited to surgical treatment.

2. Examination of the kidney-pelvis by the needle is preferable to that by the finger. The incision should be made in the long axis of the pelvis as close to the parenchyma as possible since such fistulæ heal quicker than those of the beginning of the ureter. Where, as is usual, the calices are dilated they must be examined either digitally or with a knobbed (uterine) sound. A negative result of examination with the needle does not exclude calculi lying in the kidney.

3. Where the kidney-pelvis is healthy or there is but slight pyelitis, catgut suture of the opened pelvis, *a la* Czerny's intestinal suture, after previous fixation with two loops of thread, is to be recommended. In this way the dangers of urine-infiltration or of the development of

a urinary fistula are avoided, and the duration of cure is materially shortened.

4. Nephrectomy for calculous kidney is admissible in multiple concretions, where scarcely any functioning substance remains, in the presence of suppurative pyelitis or great dilatation of the pelvis, provided the other kidney is healthy.

5. In chronic nephritic suppuration nephrotomy should first be performed and nephrectomy only secondarily after improvement of the general condition and where the other kidney is functionally intact.

6. The question as to the time when recognized internal treatment of nephritic calculus should give place to surgical must be determined individually in each case.—*Wien. Med. Wochr.* 1887, Nos. 51 and 52.

W. BROWNING (Brooklyn).

III. On Nephrolithotomy in Anuria from Impaction of Calculus. By DR. JAMES ISRAEL (Berlin). According to the author but three cases of this operation, besides his own, have been reported; namely, one by Bardenheuer in 1882, one by F. Lange in 1886, and another by von Bergmann in 1887. Author's case was as follows:

Pat., æt. 49 years, a male, had suffered for a long time from frequent attacks of gout and renal colic on the right side, together with the passing of calculi. Four days previously a severe attack of the latter had forced him to keep his bed. On the day of the author's visit he had passed no water at all. Examination showed cardiac enlargement to the left, with insufficiency of the aortic valves, bronchial catarrh, and, on pressure, greater resistance between the ribs and pelvis on the left side with increased tenderness. The skin was moist, and exuded a distinct odor of urine. Sensorium was clear but pat. had the appearance of being somewhat intoxicated. The following day the symptoms having become much more alarming, an operation was undertaken. Patient was placed on the right side. The incision began at the 12th rib, at the point where it is crossed by the sacro lumbalis muscle, and passed obliquely downwards and anteriorly to the crest of the ilium. The kidney was of enormous size and dark blue in color. The first incision, being found inadequate to enable the operator to

reach the kidney pelvis, was enlarged by a second one, 12 cm. in length, running transversely from the edge of the former. Kidney then luxated anteriorly and found to measure 18 cm. in length. A calculus was present in the pelvis jammed into the orifice of the ureter. When this was removed, a probe, introduced into the ureter, detected the presence of a second calculus stuck fast about 10 cm. below the pelvic orifice. This was removed by gentle traction between the fingers. Kidney replaced, several drainage tubes introduced, the transverse incision and upper portion of the longitudinal one sutured. Dressings of iodoform gauze. Three hours later 310 ccm. of nearly clear urine were passed per vias naturales, and the mattress was found saturated. Separate examination of the urine passed through the bladder and through the wound showed that the latter possessed a much greater quantity of coloring matters, albumen, and a much higher specific gravity, thus proving that the right kidney had resumed its functions at the same time as the left. Until the fifth day post op. the patient's condition was satisfactory. Then, however, there was a distinct change for the worse. Symptoms of uræmic intoxication showed themselves, hallucinations, illusions, etc. Microscopic examination revealed numerous epithelial cylindrical formations, epithelium from the renal pelvis, etc., in the urine. During three consecutive nights the drainage tubes became displaced owing to the restlessness of the patient. On the ninth day great decrease in the amount of urine. Delirium, coma, and death followed. In the autopsy no further calculi were found in either kidney. The pelvis of the right kidney was distended and the organ itself much shrunken. The left was much enlarged, and showed the evidences of recent purulent infiltration of the cortex. This purulent infiltration, the author states, was caused by infection due to the infiltration of urine in the perirenal tissues, in consequence of displacement of the dressings by the patient.—*Deutsch. Med. Wochenschrift*, No. 1 Jan. 5, 1888.

C. J. COLLES (New York).

IV. Cases of Nephrolithotomy. By D. HAYES AGNEW, M.D. (Philadelphia), ANDREW J. MCCOSH, M.D. (New York). A man, æt.

38, had suffered at times for ten years from renal colic, which had culminated in continuous lumbar pains with thick ropy urine containing pus, blood and renal epithelium, and other symptoms denoting a calculus in the left kidney. By a lumbar incision the kidney was reached, opened, and a considerable quantity of pus and urine evacuated, together with two stones, one in the pelvis of the kidney, and the other in the ureter, the two weighing 473 grains. The operation was done antiseptically, and the patient made a rapid and uninterrupted recovery.—*Medical News*, Feb. 4, 1888.

Dr. McCosh's case occurred in a woman, æt. 28, who had suffered since childhood from pains in her right loin. Her trouble had been variously diagnosed, for there had been no distinctive symptoms. Exploration of the kidney was decided upon, and a mulberry calculus weighing 120 grains was removed through a lumbar incision. The operation was complicated by the kidney being about three inches below its normal position. The patient made a good recovery, and is improved in general health.—*N. Y. Med. Jour.* April 14, 1888.

JAMES E. PILCHER (U.S. Army.)

V. Extirpation of a Floating Cystic Kidney. By DR. O. RIEGNER. (Breslau), Patient, a married woman, æt. 30 years, had suffered since her last confinement, in 1872, from occasional pains in the back and abdomen, but not enough to prevent her attending to her work.

In 1880, she fell down a flight of stone stairs, sustaining thereby a concussion on the left side over the lower ribs, in consequence of which she was confined to her bed for several days. Since then the pain in the left lumbar region increased in frequency and intensity, accompanied by vomiting, loss of appetite, constipation, etc. Menses regular. When first seen (Sept. 1886), a slight vesical catarrh was present, and the daily amount of urine varied between 1500 and 2000 ccm. Patient was a strongly built person with a very pale complexion. Examination showed the presence of a tumor of rather hard consistency, egg-shaped, and with a smooth surface, in the left hypochondriac region. Length of tumor appeared to be about 18 cm., its breadth 10-12 cm. When patient assumed an erect position the tumor would change its position, sinking down anteriorly, and it could

be easily pushed to the right as far as the navel. The right kidney could not be felt, and was to all appearances healthy. Urine was cloudy, but contained no albumen or blood. Its sediment showed the presence of bladder epithelium, pus, and a few red blood-corpuscles. Epithelium from the kidney was never found. The diagnosis of a floating kidney tumor was easily made, but the nature of the latter was not so easy to determine. The author tried Pawlick's method of determining the condition of the kidneys by the introduction of sounds into the ureters, but unsuccessfully. Operation on Feb. 8, 1887. Incision after Simon's method, from the eleventh rib to the crest of the ilium along the external edge of the sacro-lumbalis muscles.

The appearance of the tumor, when exposed, led the author to believe it was a malignant growth, the whole organ being dark blue, venous looking. The capsule being opened revealed the true state of things. The kidney showed cystic degeneration, being covered on its entire surface with smaller or larger cysts of a bluish color. Removal of the enlarged organ necessitated extension of original incision. Ligation of the numerous vessels required great care and occupied much time. Cavity of wound irrigated with solution of corrosive sublimate, 1 to 5,000. For draining, a long and fairly thick roll of iodoform gauze was introduced. Duration of operation about two hours. Patient rallied well. Some vomiting followed. Dressings changed the next day. The roll of iodoform gauze not removed for seven days when a smaller one was substituted. The patient made a good recovery, and was able to leave her bed early in March, her only complaint being of slight pains in her left leg, which, however, soon disappeared. The fistula was closed by the end of the following month. The patient has been in excellent health ever since and has gained much in weight.


The extirpated kidney weighed 600 grammes. Reports of cases of cystic tumors of the kidney are rare; according to Azarie Brodeur there has been, up to 1886, but twelve cases of such recorded (echinococcus excepted), of which eleven were removed by laparotomy, with seven deaths, and one by lumbar nephrotomy with recovery. In five of these cases cysts of the ovaries had been diagnosticated, in one a

cyst of the liver. Only one of these twelve cases (that of Bergmann) was, like the author's, a veritable hydrops renis cysticus. Concerning the etiology of such cystic kidneys there are great differences of opinion among pathologists.—*Deutsch. Med. Wochenschrift*, January 19, 1888.

C. J. COLLES (New York).

VI. Subpubic Cystotomy. By Dr. C. LANGENBUCH, (Berlin). Of all the older ways of opening the bladder, but two now meet with favor, viz., median perineal section, and the suprapubic operation. First, he sketches briefly the objection to each of these, respectively, the reasons why neither has gained universal preference. In the former these cluster around the operation, in the latter about the after-treatment. The latter would now be esteemed the finer operation, but for dangers which essentially depend on uncertainties in the free discharge of urine. L's present effort aims to demonstrate a new way by which this possibly may be remedied. Some much wider and less easily obstructable discharge than by a catheter is demanded, and also the possibility of more or less continuous irrigation of the bladder without endangering the suturing—and all of this possibly without recourse to the urethra.

For this purpose, he proposes to enter between the lower border of the symphysis and the root of the penis. In reality, he constructs an entirely new entrance to the bladder, for many cases alone sufficient, for others as a pre-operation for suprapubic cystotomy. From special dissections, and with the aid of four colored illustrations from Henle, he first describes the respective local anatomy.

With the subject in lithotomy position he makes a -shaped incision over the root of the penis and the rami of the pubic arch, then frees the lateral and upper parts of the root of the penis, with a knife cuts the attachments of the suspensory ligament to the symphysic surface, and with scissors the laterally attached, sail-like, ligamentous lamellæ from the albuginea. This allows the shaft of the penis to sink down. Of course, the direct attachments of the cavernous bodies to the bones are not touched.

The second step consists in freeing the firm lateral attachments of the transverse pelvic ligament. By holding scrupulously to the bone neither the aa. pudendæ nor the cavernous bodies of the penis can be injured. Here at the diaphragma urogenitale he recommends setting the knife in at the apex of the arch. First divide the arcuate pelvic ligament taking special care not to injure the vena dorsalis, nor to allow the scalpel-point by going deeper to touch the venous plexus about the neck of the bladder. Now with an elevator work a way in between arcuate ligament and bone. As soon as possible have recourse to dilating instruments, as a needle-holder and glove-stretcher. The now depressed, cord-like, transverse pelvic ligament may, if absolutely necessary, be drawn up, isolated and incised, just between the median dorsal vein and the lateral arteries and nerves.

Even a hæmorrhage could, he thinks, be more easily controlled than during a perineal operation. The vertical diameter of this opening to the bladder amounts to 4.5 cm.

The venous labyrinth of Santorini is bilateral, with anastomosing twigs. By care and working with blunt instruments, this can be pushed to each side unharmed. A segment of the bladder now presents, and can be made more accessible by filling the viscus and pressing down on the abdomen. This anterior and lower part of the bladder is partially fastened to the symphysis by the tendinous arc of pelvic fascia. This prevents the in-rolling of the wound edges, so troublesome in the suprapubic incision. Before entering the bladder, introduce a catheter, and control with the left fingers, then incise about 1 cm above the beginning of the urethra. The knife-edge should be directed upwards to avoid prostate and base of bladder. The wall here is rather thick. After fluid begins to run out, dilate bluntly. The access is not so large as by the suprapubic. If needs be, some of the bony arch may be chiselled away. For drainage he introduces two firm rubber tubes size of the little finger. The afferent is left on sewing up in the upper part of the wound. The efferent only has side openings; by means of dressing-forceps it is pushed down and out through the soft parts beside the urethra—appearing, on cutting the skin over its point, about 2 cm., in front of the anus to the right. In this way a discharge from the dependent part of the bladder is secured.

By comparing with other vesical operations, with tracheotomy etc., he concludes that there is very little fear of purulent phlebitis from veins about the field of operation. Nor from the physiology and an observed accident case does he think any lasting harm would follow closure of the median dorsal vein.

The operation is scarcely applicable in children, but would avoid a vesico-vaginal fistula in females.

He sums up the advantages as:

1. The securing of an entrance to the bladder, wide enough to extract the concretions, in most cases of calculus, *i. e.*, to break up and then to remove them. Further the direct exposure of the trigonum Lieutaudi, a very common seat of vesical tumor, or hypertrophy of prostate.

2. The avoidance of injury to delicate parts—vessels, nerves, erectile bodies, urethra, muscles of urinating and erection, the prostate, seminal ducts, rectum and peritoneum.

3. A permanent urine-outlet from the lowest point of the bladder, satisfying all demands, also sufficient drainage to avoid suppurative cellulitis.

4. Avoidance of the so untrustworthy bladder suture with all its even life-endangering accidents.

5. The doing away with a permanent catheter, and consequent urethral irritation, and also with repeated catheterization.

6. The possibility of primary wound-union.

Inasmuch as this method does not secure as free entrance as the suprapubic operation it may in special cases, be necessary to add the latter, and thus gain the advantage of both. He thinks it is not as easy as the simple suprapubic, but easier than the perineal methods.

His whole paper represents a suggestion and an incentive, and not an actually applied procedure.—*Lie Sectio alta subpubica*, Berlin: Hirschwald, 1888.

WM. BROWNING (Brooklyn).

VII. Case of Extroversion of the Bladder Treated by Preliminary Division of the Sacro-Iliac Synchrondroses, (Trendelenberg's Operation). By MR. G. H. MAKINS, (London).

The patient was a male child, æt. 5 years. An attempt to raise a flap by Thiersch's method had failed three years before. The division of the sacro-iliac synchondroses permitted approximation of the anterior superior iliac spines to the extent of one inch, with corresponding diminution of the gap existing in the situation of the pubic symphysis. This gain was maintained by means of continuous extension. Two months afterwards an attempt was made to unite the opposite boundaries of the bladder, which failed, presumably in great part owing to the tension due to the old cicatrix. The bladder was then covered by means of a single lateral Thiersch's flap at a later date, the exposed surface having been reduced in area from 3.25 inches by 3.25 inches, to 1.5 inches by 1.5 inches. The following advantages were claimed for this mode of operating.—1. Saving of time. In one of Trendelenberg's cases the whole procedure, excepting the closure of a small fistula, occupied eight weeks only. 2. A perfect mucous lining to the bladder, interrupted only by a median cicatrix was obtained. 3. Failure of the primary operation in no way prejudiced subsequent measures. 4. Should primary union fail, much smaller flaps were required than in the usual operations. 5. The superficial area was not merely lessened, but a gradual backward sinking of the bladder wall accompanied the decrease in diameter. 6. The last two points were of especial importance in cases like the present one where a cicatrix interfered with the ready fashioning of flaps. 7. The closure of the symphyseal gap offered a better support for the abdominal viscera.—*Royal Medico-Chirurgical Society*, March 27, 1888.

C. B. KEETLEY (London).

VIII. Hypertrophy of the Prostate and its Relief by Operation. By F. A. MCGILL. F.R.C.S., (Leeds). It is pointed out that considerable prostatic enlargement may exist without causing much interference with micturition. The author gives three forms of enlarged prostate which give rise to characteristic symptoms, and which moreover have this feature in common, viz., that they project into the bladder, and may consequently be described as vesical and not as perineal outgrowths. The varieties are : 1. A uniform circular

projection surrounding the internal orifice of the urethra. This Mr. McGill believes to be the commonest of the three forms of vesical prostate when an examination is made in the *living* subject, for when the bladder has been removed from the body, the prostate loses the support of its capsule and other fibrous tissues and consequently the projection into the bladder cavity is to a great extent lost; 2. A sessile enlargement of the middle lobe; 3. A pedunculated enlargement of this lobe. After showing how these forms of prostatic hypertrophy prevent in a greater or lesser degree the outflow of urine, the author recommends a new operation—suprapubic prostatectomy—in cases where operative interference is called for.

The operation is shortly as follows; 1. Suprapubic cystotomy the bladder and rectum both being distended; 2. Examination of the interior of the bladder, and if a condition of prostate as described above is found; 3. Removal of the same by means of scissors curved on the flat.

Prostatic hæmorrhage is said not to be excessive. Five cases are mentioned which have been treated in this manner. One remains under treatment, the rest made a quick and satisfactory recovery and passed urine, without the aid of a catheter in a natural manner, whereas, before the operation constant catheterism was requisite. Two of the patients were seen after an interval of eight months and neither had in any way relapsed.—*Lancet*, Feb. 4, 1888.

IX. A Lecture on Tumors of the Bladder. By SIR HENRY THOMPSON, (London). After mentioning the varieties of vesical tumors and describing their symptoms, the lecturer in considering the question of operation, strongly deprecated any attempt to remove a cancerous growth though it might be necessary to open the bladder in such a condition to afford relief; although it had never fallen to his lot to meet with a case where such a proceeding seemed advisable.

For practical purposes two distinct classes of cases are met with. The larger class consists of those patients in whose urine the debris of papillomatous growths are found and which can be identified as such by the microscope. The second class consists of those cases in which

the symptoms point to vesical neoplasm, although no debris is to be found after repeated examination in the urine. For these, with rare exceptions, digital exploration, through a small opening in the perineum should be performed. This does not in the least interfere with a suprapubic cystotomy should such be necessary. For the first class this preliminary perineal incision is unnecessary, and Sir Henry Thompson, now that the value of the suprapubic operation is established, recommends its being undertaken forthwith. On this point he says: "When I first began to remove vesical tumors the value of the the new suprapubic procedure in regard of simplicity, safety and efficiency, had not been established; but an enlarged experience of it in my own hands, has convinced me that it offers advantages when the tumors are multiple or considerable not to be obtained by the perineal route. I cannot recommend that it should be performed when you merely entertain a suspicion, however strong, that tumor is present in any given case. As long as the absolute proof arising from fragments passed in the urine is absent, the perineal exploration is the only legitimate proceeding, unless it is deemed better to wait and make further research for indubitable evidence."

The lecturer has altogether operated on thirty-eight patients. [Although it is not stated, this presumably includes both perineal and suprapubic operations], There appear to have been six deaths, four patients dying within a few days of the operation, partly from exhaustion, two from cystitis and peritonitis. Two succumbed to blood poisoning each on the twelfth day, one after the perineal incision and the other after the removal of a large tumor by the suprapubic route. Several are living with threatening return; the great majority have gained relief from severe symptoms, and some extension of life, varying considerably in different instances.—*Brit. Med. Jour.*, Jan. 7 and 14, 1888.

F. SWINFORD EDWARDS (London).

X. Case of Self-Mutilation of the Scrotum. By DR. ALEXANDER A. LESHTCHINSKY, (Dinabürg). An intense aversion felt by the kind-hearted, peaceful and industrious Russian peasantry toward

the military service from century to century, furnishes a near and sufficient explanation of the fact that all over the vast Empire there flourishes a numerous class of specialists (mostly retired *feldshers*, medical assistants) whose practical work consists in secretly maiming recruits in all possible ways affecting the qualification of the patient as an "unfit." The tale of Dr. Leshtchinsky may be taken as a typical illustration of what is daily done by the "surgeons" in question. The author was recently called to an athletic Lettonian peasant of twenty, by his brother who frankly confessed that about five days before, the patient had been made "unfit" by a local *feldsher* in this way. The "surgeon" had taken the lad to a Russian bath, placed him on the *polok* or sweating loft, and, after a good "steaming through" of the field of operation, pierced the patient's scrotum, through its whole thickness in an upward direction, by a big (saddler's) needle armed with a thread soaked in a caustic oily yellowish liniment; having drawn the needle out of the upper puncture, the operator had cut the thread with scissors, and withdrawn it from the lower punctures. At the time the lad felt only a slight local burning; but on the next day there appeared a rapidly increasing, exceedingly painful swelling of the scrotum with a vivid redness, on the third day a rigor followed, while pain and swelling became so great that the lad walked with difficulty. On the fourth day an abscess about the puncture made its appearance, bursting spontaneously and giving vent to a profuse blackish purulent discharge. When seen by the author on the fifth day, the patient lay on the floor with widely separated thighs, and was loudly groaning from an agonizing pain. His scrotum was found to present an intensely red, glossy, tense globe as large as the head of an infant of 2 or 3 months. Its lower integument, however, was covered with vesicles, erosions and dark blue sloughing spots, while on its posterior aspect, corresponding to the right testis, there was seen a large, irregularly oval ulcer of the size of a florin, with uneven ragged edges and flat bottom lined with a grayish tallow like coat. The right testis and epididymis were considerably enlarged and highly tender. Under the influence of an antiseptic dressing and ice, the youth recovered in about a fortnight. His purpose had been realized, the recruiting

committee had rejected him as an "unfit" on the ground of an examination on the third day of his self-inflicted disease.—*Russkaia Meditsina*, No. 6, 1888, p. 97.

XI. Case of Foreign Body (Sow-Thistle) in Male Urethra.
By Dr. DENITRY N. IBANKOFF (Soligalitch, Russia). The writer details an interesting case of a male peasant, æt. 60, who experiencing some difficulty in micturition, had attempted to empty his bladder by means of an improvised catheter in the shape of a piece of the stem of the sow-thistle (*Sonchus oleraceus* Russ. *Osot*). The instrument somehow slipped out of the operator's hand, and got entangled in the channel in spite of all domestic efforts to extract it. When seen the next morning, the man looked greatly frightened and complained of pain about the bladder as well as of an intense scalding and pain along the whole urethra, and incessant vesical tenesmus, the urine constantly dripping out drop by drop. The penis, (twelve centimetres long) was greatly swollen, the prepuce œdematous. The foreign body being very soft, could not be felt from without, but a probe struck it at the depth of 5 cm. and easily passed between the stem and the urethral wall. Taking into consideration, on one side, that the foreign body was soft, smooth and relatively thin, and, on the other hand, that the literature contained several instances of a spontaneous expulsion of foreign bodies from the urethra by a good-sized jet of urine¹ (Koenig, Bardeleben), the author advised the man to drink freely and to pass urine only at long intervals. This plan, however, proved a failure and cost the patient, other twenty-four hours of unabated restlessness and suffering from tenesmus, etc. No instruments, except a children's metallic catheter, being available, he proceeded to remove the foreign body after Dittel's method (somewhat modified). Having fixed the body by firmly compressing the member at its root, he passed the catheter down the urethra, until at the depth of 18½ cm., "a con-

¹Dr. Ibankoff himself lately happened to see a case of the kind, where a urethral calculus of the size of a pea was pushed by a powerful jet of urine up to a point in 1½ centimetres from the urethral orifice and could then be easily extracted by a pair of forceps.

siderable obstacle was met, and the man began to complain of a pricking pain at the spot; the catheter was then very slowly withdrawn, its end being pressed down to the urethral wall all the way." The stem (a hollow one) measuring 20 cm. in length and 1 cm. in circumference, came out with the instrument, its anterior end having been glued firmly to the catheter about 5 cm. from the urethral aperture, while its posterior extremity was projecting about $6\frac{1}{2}$ cm. beyond the catheter's tip. In about three days the man's micturition became normal. He was well when seen two months later. The stem extracted was found to be intact in its anterior portion (14 cm. long), while the posterior one (6 cm. long) was split, crumpled and bent at five points. Dr. Ibankoff thinks that, on reaching the isthmus urethræ, the soft stem could not pass through this narrow channel and, under a continuous pressure of the man's hand, formed five bends, one after another, all of which came to lie in the bulbus urethræ, filling up its entire lumen. The extraction, succeeded, probably, partly through catching one of the bends with the instrument's end, and partly owing to an adhesive action of the glycerine.—*Vratch*, No. 50, 1887, p. 962.

XII. Cases of Foreign Bodies (Knitting Needle, Eggs, Bougie, Catheter,) in Genito-Urinary Organs. By Drs. JANSEN (Riga) and VOSS (Dorpat). At a meeting of the Riga Medical Society, Dr. Jansen read the case of a lad, æt. 15, who had introduced into his urethra a piece of a knitting needle, about 10 cm. long, and lost hold of it. Seven days later, he was admitted with vesical pain and tenesmus, turbid urine and fever (38.7° c). An exploration by a catheter showed that the needle lay tightly fixed in the anterior segment of the bladder. All attempts at a bloodless extraction having failed, a median section was performed without delay. The removal of the foreign body, however, could be effected only after breaking it into two fragments (6.1 cm. and 3.6 cm. long). On the fifth day of the after-treatment—intra-vesical irrigations with a one-sixth per cent solution of salicylic acid, the wound being left open—the temperature returned to the normal. From the 13th day the urine passed through the urethra. On the 28th day the lad was discharged cured.

Dr. Jansen mentions also that he lately came across an extraordinary case of foreign bodies in the vagina, the bodies introduced (and subsequently easily extracted by means of a spoon and injection) being several hard-boiled eggs. No further details given.

Dr. Voss reports the case of a man who broke a Vienna bougie in his urethra, the fragment, 8 cm. long, being first jammed in the stricture, but subsequently descending into the bladder. A median section was performed. The foreign body, on being grasped, broke into three pieces which were removed separately. A day later a vesical hæmorrhage occurred; it was treated by morphia, ice and (on the 3d day) washing out the clot. The man made a good recovery.

In another (male) case related by Dr. Voss, a catheter broke in the patient's hand just behind the urethral orifice. On attempts at withdrawing the fragment, it was gradually pushed down to the membranous part of the channel where it got fixed. The author succeeded in extracting it through the urethra.—*St. Petersburger Medicinische Wochenschrift*, Jan. 14, 1888, p. 11,

XIII. Case of Lacerated Contused Wound of the Scrotum. By Dr. ALEXEEFF (Knaïgīnin, Russia). A peasant, æt. 50, of a middling constitution, when working at his flour-mill, was caught by the mill-wheel across his body and dragged along for some distance. When brought to a local infirmary several hours later, the man looked frightened and collapsed, and complained of agonizing pain about the parts injured. The right inguinal region was greatly swollen, excoriated, contused, and extremely tender. There was present further a widely gaping lacerated wound with inverted edges, which commenced at the symphysis pubis and descended along the left side of the scrotum down to the lower segment to ramify here into two branches, one of which curved around backward to terminate at about the middle of the posterior aspect, while the other extended along the whole inferior surface. The depth of the laceration was unequal; at some places only the skin was broken, but its largest portion included the whole thickness of the scrotum, the left testis and spermatic cord lying fully exposed. The testis was soft, its albuginea partially lacerated, par-

tially contused (studded with red spots). All the parts injured were washed out with a three per cent. solution of thymol, the scrotal wound partially closed with "ordinary suture," and a cold lead lotion applied.

During a fortnight the patient's state was grave, since there appeared a profuse offensive suppuration in the right groin with subsequent sloughing of a portion of the inguinal integuments; in addition, a piece of the scrotal wall also sloughed away, leaving the testicle wholly bare. The man grew exhausted, markedly lost flesh, was drowsy and had fever. About the 15th day, however, the temperature returned to the standard, appetite appeared, the pus became sweet, and henceforward the wounds began rapidly to fill up with healthy granulations. On the 58th day after the accident, he left the hospital with his wounds healed.—*Russkaia Meditzina*, No. 5, 1887, p. 94.

VALERIUS IDELSON (Berne).

XIV. The Technique and After-treatment in External Urethrotomy. By DR. PAUL GUETERBOCK (Berlin). The vesical portion of the urethra can be more easily found if the peripheral portion of the healthy urethra be secured well in front of the point of stricture or rupture. The best method to attain this is to fix the lips of the wound in the urethral mucous membrane, by means of sutures and draw these externally. This device has been used by von Bergmann in operations on mouth and pharynx. The author thinks the fixation of the lips of the urethral wound to the cutaneous borders of the perineal wound is indicated, to stop parenchymatous hemorrhage during or after the operation, as a substitute for sutures in fixing the borders of the urethral wound at the entrance to the stricture and to maintain a perineal fistula for a period without the necessity of introducing an instrument immediately after the operation. Cases may also be here included where there is great loss of substance of the wall of the urethra. (Rupture with fracture of the pubic bones.) The author does not at the present day regard the failure to find the vesical part of the urethra in external urethrotomy as a failure of the entire operation. The finding of the vesical urethra is highly desirable and satisfactory, yet cases in which it has not been found have ended in recovery. If the

vesical end of the urethra is not found, the infiltration of urine at least is avoided by the perineal wound.

It is in most cases possible before operation to surmise whether the urethra will be found with difficulty or not. As an aid to finding the vesical urethra, the author mentions the combined method, a modification of that of Gayet, by which the residual urine in the bladder is pressed through the urethra into the wound by the hand pressing on the bladder above the pubes while the fingers of the other hand exert a counter pressure on the organ through the rectum. As to after treatment the author thinks that in the vast majority of cases of external urethrotomy equally favorably results are obtained with or without permanent catheterization. The good consequences ascribed to the retained catheter are no doubt overdrawn. The method of Syme is mentioned. Here a catheter is introduced only for the first few days after operation. The precaution not to introduce the catheter too far into the bladder (Spence) is discussed, and the author points out the necessity for the retained catheter in cases of distinct infiltration of urine.—*Zeitschr f. Chir.*, bd. xxv. hft. 4 and 5.

XV. The Operative Treatment of Priapism. By DR. VORSTER (Berlin. Two cases of priapism relieved by operative interference. In the first case the patient suffered from nervous symptoms following a hemorrhage (hæmophilia). The priapism followed a difficult fecal evacuation. The symptoms persisted for days, giving rise to atrophic paraphimosis (Rose). Incision of the preputium penis here relieved symptoms. In the second case a traumatism of the urethra with hæmatoma resulted from the kick of a horse. Here the blood tumor compressing the corpus cavernosum penis and preventing venous return, favored the persistence of priapism. External urethrotomy, incision of the blood tumor (projecting into the lumen of the urethra), and emptying the hæmatoma of clots, relieved symptoms.—*Zeitschr f. Chir.*, bd. 27. hft 1 and 2.

HENRY KOPLIK (New York).

ULCERS, ABSCESSSES, TUMORS.

I. Perforating Ulcer Connected with Certain Forms of Latent Spina Bifida. By E. KIRMISSON (Paris). The author mentions three cases. The first, under his own care, was a man, aged 26, admitted for a very large perforating ulcer of the left sole. For ten years he had had recurring attacks of the same disease in the right foot, which had led to amputation of two toes and loss of the phalanx of a third. The left foot had only been invaded for six months. He had also, in the feet and lower third of the legs, lost sensations of touch, pain and heat. His knee-jerks were absent, and there was some difficulty in micturition. He had likewise a tumor, resulting from a spina bifida spontaneously cured. A second case was found in the clinic of Krönlein at Zurich. He relates a third described by Recklinghausen. This was a man of 25, with a similar tumor in the back and a left club-foot. For nine years he had shooting pains in the left leg, for four years anæsthesia of the left foot with a perforating ulcer. The thigh was amputated; the patient died; the post-mortem discovered that the tumor, most of which had been removed in early life, was connected with a spina bifida, and that the nerves of the leg were perfectly healthy. He suggests that the spina bifida is connected with atrophy or maldevelopment of nerves going to the leg, which cause the perforating ulcer, but this last case, in which alone the nerves have been examined, does not give support to his suggestion. The condition of the spinal cord is not mentioned.—*Bull. Med.*, Sept. 7, 1887.

W. P. HERRINGHAM (London).

II. The Incision of deep Perirectal Abscesses from the Perineum. By DR. H. ZELLER, (Tuebingen). The cases under consideration are abscesses high up along the rectum, situated either laterally or anteriorly, to be felt as fluctuating tumors in the rectum. Three abscesses of this kind under the author's observation, were incised from the perineum, not as is generally the case, from the rectum. The perirectal abscesses lie either above or below the diaphragm of the pelvis, and differ in their further course according to their situation those above the diaphragm very rarely perforating towards the perineum.

Those below the diaphragm are by far the most frequent; they develop between the superficial and deep perineal fascia. Those lying above the levator ani start in the prostate or the surrounding connective tissues. These abscesses are the result of gonorrhœal infection, violent catheterization, or inflammation spreading from the gut through the many lymphatics and bloodvessels. In the prostate gland they begin either as isolated small foci, flowing together, and finally connecting the entire gland into one large abscess, or at the outset as a single abscess. They have been known to contain as much as 5 or 6 oz. of pus. Frequently these abscesses perforate into the periprostatic tissues. Of the abscesses lying above the diaphragm and pelvis, two varieties demand special notice—stercoral and congestive. The former are most frequently due to infection from ulceration high up in the rectum (syphilitic); the latter are very rarely met with, when tuberculous abscesses gravitate towards the rectum along the pelvic fascia and not in the course of the psoas muscle. Occasionally the etiology of these abscesses remains obscure, as in two of the author's cases, where such abscesses resulted five months after a fall upon the buttocks and three weeks after the extirpation of a papilloma of the bladder. A feeling of weight and pressure in the abdomen, functional disturbances of rectum and bladder, and fever are symptoms that with rectal palpation will generally allow a diagnosis. The author records the interesting observation that of ten per cent. of published cases the diagnosis was not made in two, as a plea for thorough rectal exploration. Prostatic abscesses generally perforate into the urethra, spontaneously or during catheterization. This evacuation does not follow immediately, but the newly formed pus is emptied from the urethra in large quantities at various intervals. On perforation these abscesses often heal up, but now and then, when the opening is small, the conditions for such a termination are vastly unfavorable. Of 35 perforations into the urethra 10 patients died of pyemia, peritonitis, pyelonephritis and four, as stated, of other complications not in connection with the primary disease. Or in other cases the pus burrows its way into the rectum, or the abscess points in the perineum. Abscesses that only affect the prostate gland itself, always perforate into the bladder or more

frequently the urethra. Second has collected interesting statistics regarding the perforation of perirectal abscesses; 35 perforated into the urethra only, 77 elsewhere, (43 into the rectum, 29 into the urethra, 15 in the perineum, 5 towards the inguinal region, 3 towards the ischio-rectal fossa, and 2 towards the foramen obturatorium).

The prognosis of all these deep-seated abscesses has been very unfavorable (20 per cent deaths). Many of the patients have retained fistulous communication with rectum or bladder or both, which have never been cured, or, in very rare cases, after prolonged and tedious treatment. It must be stated that the dangers of urinary infiltration are not so great, as the walls of the fistulous ducts are thickened by chronic inflammation and thus form somewhat of a barrier against such infiltration. To avoid all these complications the author proposes to incise all such abscesses from the perineum even if they point in the rectum and would seemingly be opened with greater facility according to the old method. Against the latter procedure he objects on the following grounds: too small an incision, the location of the incision which would not be at the most dependent point of the abscess, difficult antiseptis; the incision opens up a direct communication between rectum and abscess; it does not prevent the formation of a urethro-rectal fistula, which is by far more intractable than a urethro-perineal fistula; the dangers of hæmorrhage from the rectum. The difficulties attending the operation urged are perhaps the cause why it has not as yet been adopted instead of the rectal incision, although often recommended. At the beginning of the present century Guthrie spoke in its favor; later on Velpeau, Lallemand and Demarquay practised perineal incisions. Nélaton (1859) regarded the proceeding as too dangerous; Dittel, Thompson and Guyon held varying opinions regarding the treatment of these abscesses. Dittel advocates the incision at the place where the abscess points (1877). Thompson, formerly of the same opinion, now strenuously upholds the perineal incision for all cases. Guyon has passed through a like change of opinion and performs perineal incision in all cases not perforating into the urethra. The author has been able to collect 7 cases of abscess pointing to the rectum, which were treated by perineal incision. From these

and his own 3 cases he offers the following data: in none of the cases did a fistula remain; in 4 patients the abscesses had previously perforated into the urethra, and the progress of these cases was somewhat retarded, though complete restoration eventually followed; after the incision no perforations in other directions ever occurred. Of 13 patients whose abscesses were incised in the rectum 2 died (peritonitis and pyæmia), and of 21 patients, in whom urethro-rectal fistulæ developed, 4 remained uncured. The author recommends an incision either in the median line, or lateral incisions parallel to the raphé or corresponding with lateral incision for stone. After the skin has been divided, it is advisable to work one's way to the abscess, without the use of cutting instruments, controlling all hæmorrhage. The left index finger can be pushed into the rectum and made to bear upon small abscesses, thus making them project into the wound. It is well to control the position of the urethra with a sound.—*Beiträge zur klinischen Chirurgie. Mittheilungen aus der chirurg. Klinik zu Tübingen*, Bd. iii., hft. 2.

FRED KAMMERER (New York).

III. Pure Fibroma of the Tendon of the Palmaris Longus. BY DR. PAUL SENDLER. A cabinet maker, æt. 42 years, presented a swelling on the forearm just above the wrist, combined with darting pains in the first three fingers. The hand became easily fatigued with work, and the muscles of the ball of the thumb became relaxed, so as to render the hand practically useless. The tumor before operation was supposed a tense hygroma. Operation and complete extirpation of a spindle-shaped tumor was performed. It proved a pure fibroma of the tendon. After suture of the tendon the patient was well able to use the hand and pursue his trade. After a time, however, the darting pains in the hand reappeared in the course of the median, and also the fatigue of the hand. Moist gangrene appeared on the tips of the middle and index fingers of the hand (neuritis ascendens). The malady remained limited and under galvanic treatment the patient made a full recovery. The neuritis was probably the result of the previous pressure of the tumor on the median nerve.

IV. Studies on Lipoma. By DR. J. GROSCH (Dorpat). The author first discusses lipoma of the scalp. It is rare in this situation. Among 685 lipomata spread over different regions of the body, 13 occurred in the vicinity of the scalp and forehead. This is of far less frequency than fibroma or sarcoma of the same region. Billroth in a report of 16 years' practice at the clinics in Zurich and Vienna only notes two lipomata of the forehead. Gurlt in statistics of 287 cases of lipoma record only 6 lipomata of the head. As regards structure, the external surface of lipomata of the head differs from those of other parts of the body in that it is smooth, not showing the lobular division of the tumor (lipoma) found in other regions. If there is a fold found it is generally circumscribed, and more at the periphery of the tumor. Exceptionally do we find the connective tissue so great as to give these tumors an elastic or hard consistence (lipoma fibrosum tuberosum). In size and growth lipomata of the head do not differ from lipomata in other parts of the body. The forehead must be regarded as the favorite seat of lipomata of the head.

The lipoma of the head takes its origin in the tissue underlying the galea aponeurotica, respectively, also the frontalis muscle, similar in this to the dermoid growths, and differing from the atheromata which are found in the cutis proper. This relation of the lipoma gives rise to a peculiar wall-like structure around the base of the tumor and projecting above the level of the cranial bones. The tumor appears as though sunk in a depression of the bone. This is nothing more than a resistant infiltration of the pericranium and subepicranial tissue. It might give rise to the erroneous diagnosis of fracture with depression. Von Bergmann records a case where this ring around the base of the tumor was bony in structure, and was combined with a depression in the frontal bone. Connections with the pericranium may make this variety of tumor immovable. These tumors are almost equally frequent in the sexes, and all ages are subject to them. The author gives no positive conclusions as to etiology. The differential diagnosis is to be made as above from atheroma, also from dermoid cysts. The latter being congenital appear early after birth, they have a seat of election (orbital ridge), and their outward form or puncture would aid the

diagnosis. Equally as rare as lipoma of the head is lipoma of the volar surface of the hands and fingers. It gives rise in this situation to errors of diagnosis (hygroma of tendons). The author places the frequency of lipoma of the foot at 0.43%, of the hand, 1.33%.

This average is obtained from a topographical chart of tumors in all regions of the body. The lipomata of the hand are situated under the palmar fascia. They do not invade the region of the wrist or the lower forearm and are not as movable as hygroma. Lipomata may project through the interosseous spaces in the dorsum of the hand; hygroma does not. Hygroma of the hand may invade the wrist and lower forearm. These growths occur most frequently on the neck and back of the neck; the posterior aspect of the trunk from the nape of the neck to the buttocks is strongly disposed to these growths, while the anterior aspect of the trunk is less affected by them. They are comparatively rare in the face. The lower extremities are little affected by these growths. The frequency on the palm of the hands and plantar surface of the feet has been noted. This localization is true of the simple, diffuse and multiple lipomata. The localization also to a certain degree corresponds to the distribution of the sebaceous and sweat glands in the skin. The frequency of these growths in certain parts bears an inverse ratio to the growth of hair (sebaceous glands). The author concludes that the localization of all lipomata is determined by the richness of a particular region in glandular apparatus, and the growth of tumors bears an inverse ratio to the frequency of glands in any region of the body.

The author in concluding seeks to trace a connection in the majority of cases between a predisposition of certain persons to obesity and the formation of lipomata. Those places most free from glands (sebaceous) are the seat of accumulations of fat in obesity and the same is found to be the case with lipomata. Therefore the same constitutional predisposition may be the source of both these diseases. Again he would explain those cases of lipoma occurring in persons little disposed to fat accumulation as a trophic neurosis of the skin. From this standpoint many lipomata might be regarded as a neuropathic skin affection.—*Zeitschr. f. Chirurg.*, bd. xxvi, hft 3 and 4.

HENRY KOPLIK (New York).

SYPHILIS.

I. Primary Chancres.—M. DREVET, (Paris) M. LESAGE, (Paris) M. THIÉRY, (Paris).—M. Drevet, in his thesis examines the circumstances which may protract the period of incubation of infecting chancres, or delay the attack of secondaries. The most important he considers to be advanced age, pregnancy, and the febrile state, above all the latter. If the patient after contagion from syphilis suffers from an intercurrent febrile disorder (*e. g.*, typhoid fever) it would appear that the normal evolution of the syphilis may be disturbed or perhaps even stopped entirely. It is evidently extremely difficult to be certain of the latter fact, but that the occurrence of typhoid fever, etc., may very naturally delay the onset of secondaries admits of little doubt. We have observed a striking example of this at the London hospital.

M. Lesage reports in a thesis, three cases of inoculation of the syphilitic virus by means of bites received in street quarrels. In one the chancre was situated on the cheek, in another on the thumb, and in the third on the ear. Whilst the wound may slowly heal, and no true ulcer appear, the syphilitic infection is revealed by the dusky color and the induration beneath the scar.

M. Thiéry anxious to shorten in certain cases the disappearance of the induration of primary sores, has employed freely two methods, cauterization and excision. He uses them only on true infecting chancres, not pretending to prevent secondaries, but simply aiming to relieve the patient of an annoying lesion. Any well defined small chancre in a convenient situation (*e. g.*, the prepuce) he excises: for other ones he employs repeated applications of the actual cautery (at intervals of two or three days). M. Thiéry holds that all local medicaments (including iodoform and mercurial dressings) are useless in promoting healing of chancres, and quotes a number of cases illustrating his results.—*Gaz. Méd. de Paris* 1887. Nos. 18 and 12.

II. The Treatment of Syphilis, by the Subcutaneous Injection of Calomel. In a previous number of the ANNALS (vol. v. p. 174) the injection treatment was noticed in an abstract of an article by

Mr. Bloxam. Several continental writers (Prof. NEISSER, Dr. KRECHE, M. BALZER, etc.) have lately been advocating the use of calomel administered in the same manner, and it will be convenient to notice them together. It is recommended that the calomel be administered in doses of about twenty grains, in water containing chloride of sodium to the same amount (Kreche) or one-fourth the amount (Neisser) or that the drug be suspended in oil of vaseline (Balzer). Du Castel and others, however, prefer yellow oxide of mercury suspended in mucilage for injection, and claim that it is less likely to set up an abscess than calomel. From four to six injections are made at intervals of a month, and it is claimed that this treatment suffices in most cases. To assert (as M. Balzer does) that a single injection is sometimes sufficient, appears to reduce the "mercurial treatment" almost to an absurdity. However the same observer whilst claiming great results from the calomel injections in cases of cerebral syphilis, mentions the fact that he was giving large doses of iodide internally at the same time! Without wishing to detract from the value of the treatment under consideration, it must be mentioned that in several points its advocates do not agree, and that the advantages claimed for subcutaneous injection can hardly be said to have been very completely demonstrated.—*Gaz. Méd. de Paris*, May 28, 1887. *Munchener Med. Wochenschrift*, 1887 No. 6.

III. The Influence of Erysipelas on Syphilitic Lesions by M. COSTELLA (Italy) and M. MOLNAR (Austria). The first case was one of inherited syphilis in a girl of twenty-one, who had certainly suffered to an unusual extent from disease of the joints: both knees, one shoulder, and both elbows had been the subject of chronic synovitis, in the last case leading to ankylosis. There was much enlargement about the epiphyseal lines, many subcutaneous gummata, and large ulcers over both shoulders. The spleen and liver were also enlarged. During her treatment in the hospital by sublimate injections and iodide of potassium, she passed through two attacks of erysipelas, each of which appeared to have the most beneficial effects upon the syphilitic lesions. The ulcers healed, the liver and spleen returned to their normal size, the swelling about the joints subsided, and the pa-

tient gained very considerably in weight. Whilst of course attributing this improvement largely to the treatment, M. Costella believed that the erysipelas hastened the recovery materially. Its remarkable effect upon chronic ulceration due to inherited syphilis has been observed frequently, in fact we knew of one case which was sent into an erysipelas ward in order to be inoculated, and in whom the experiment was very successful.

M. Molnar's case was one of acquired syphilis (in the secondary stage) in which the patient had an extensive ulcer over one parietal bone with necrosis. Whilst in the hospital for his syphilis he contracted erysipelas of the head, the attack leading to marked improvement of the ulceration, which ultimately cicatrized.—*Giornale Ital. dell. mal. venere etc.* July 1886; *Oestu medic. chirurg. Presse*, 1887, No. 9.

IV. The Pigmentary Syphilide. By M. BOCKART, (Berlin) and GOMALO. R (Paris). By this not too precise term is understood a secondary eruption, somewhat resembling tinea versicolor, met with especially on the back of the neck and on the neighboring parts. The color of the patches or stains varies from a brownish-black, (as in Bockart's case, to a yellowish-grey: they have been figured in the *Journal of Syphilis and Cutaneous Diseases*, and in the New Sydenham Society's Atlas of Skin Diseases. It is now admitted by authorities on the subject (Fournier, Hardy, Taylor, etc.) that the eruption is almost entirely confined to the female sex, that the pigmentation is extremely slow to disappear, and that specific treatment has little or no effect upon it. The rarity of the affection is indicated by the fact that the writers now referred to, have each been able to report only one case. M. Romalo holds that the pigmentary syphilide occurs chiefly in women of lymphatic temperament, with fine transparent skin, or in those much debilitated by their syphilis. Bockart's case was a girl, æt. 20 years, admitted for condyloma, mucous patches on the throat, glandular enlargement, etc. Dark brown stains were present on the neck, the trunk, and the limbs, varying in diameter from one to five centimetres. Antisyphilitic treatment produced rapid subsidence of the symptoms,

but did not affect the eruption which still persisted a year later, having now, however, assumed a yellow tint. A piece of the affected skin having been excised showed on section, thrombosis of the smaller vessels of the corium, their walls being thickened and surrounded by pigment. The cells of the rete Malpighii were also deeply pigmented, and this the author traces to the escaped coloring matter of the blood. This observation throws considerable light on the peculiar resistance of the syphilide to mercurial treatment.—*Thèse de Paris. Wochenschrift f. prakt. Dermatologie*, January 1887.

V. Syphilitic Affections of the Ear. By M. ALBERT ROBIN and M. G. JÉGU, (Paris). Both these writers confirm the statements of Mr. Hutchinson as to the prevalence of labyrinthine deafness amongst those affected with inherited syphilis, of its tendency to appear about the age of puberty, and of its extreme intractability to specific or other treatment.

Bipp has asserted, relying solely on the symmetry, that the lesion is central, (in the floor of the fourth ventricle). As in acquired syphilis deafness may result from inflammation of the middle ear secondary to pharyngeal ulcers and gummata, further in inherited syphilis painless otorrhœa may occur as a primary affection. The absence of pain is asserted to be a valuable sign in distinguishing this from the scrofulous form, etc.

The various other syphilitic lesions of the ear, such as gummata of the meatus, etc. are dealt with in M. Jégu's work, which is based on 58 cases.

Those who are interested in the subject of syphilitic affections of the kidney will find a valuable review of the subject by M. Barthilemy, in the *Bulletin Médical* for May 22 and 29, 1887.

The writer quotes the observations of all the chief English and Continental writers, but since no new material is added an abstract is hardly required.

J. HUTCHINSON, JR. (London,).

VI. Chronic Syphilitic Tumor of the Metatarso-phalangeal Region. By A. VERNEUIL (Paris). Valerie T., æt. 42 years, married 17 years. Four children, three died in infancy. Primary syph-

ilis a few months after marriage. Secondaries soon followed; later tertiary syphilis.

Eighteen months previous to admission there appeared on the internal aspect of the metatarso-phalangeal joint of the left great toe an indolent swelling, which slowly increased until at the end of a year it was the size of a pigeon's egg. Soon afterwards jaundice appeared. The rest in bed which was required for the jaundic, brought no improvement to the tumor, which increased in size, and the skin sloughed. There was now pain and fever. On admission into the hospital there was general jaundice of conjunctiva and skin, the slough was about 5 cm. by $3\frac{1}{2}$ cm. The swelling was subsiding, and would apparently soon be replaced by an ulcerated surface with deep edges, sharply cut out and uneven, the surface of a grayish color, and still partly covered by minute sloughs.

Syphilis was at once diagnosed. The joint did not seem affected. No œdema. Inguinal glands enlarged. The liver was tender, no other organ was abnormal. Urine bilious, motions of a natural color. The liver was two finger's breadth below the ribs, gall bladder could not be made out. (A history of repeated hepatic colic was now obtained). No splenic hypertrophy. Specific treatment was employed internally, locally Vigo-plaster. The local and general condition greatly improved, until suddenly on July 5, acute erysipelas of the face. Patient had had facial erysipelas a year before, and there had been three cases in the ward lately. Specific treatment was intermitted. Purgatives and emetics were administered, and the patient supported on acidulated drinks and a little milk. The temperature was nearly 104° F.; and the condition very severe. Two days later congestion of the lungs was present, and the temperature rose. The next day (the 9th) the scalp was affected, and the temperature had risen to nearly 105° . On the 10th there was decided improvement, this being attributed to a large blister which had been applied the previous day to the region of the liver. On the 12th the attack was over. The foot did not appear to be affected by the erysipelas, the specific treatment was recommenced, and by the end of July the ulcer was practically healed.

The following are the points to illustrate which the case is given :

1. That the syphiloma was not a gumma nor a periosteal affection but rather an affection of the bursa over the inner aspect of the great toe.

2. The slow growth (18 months) is not uncommon in syphilitic growths of serous membranes.

3. The hepatic enlargement was not syphilitic, but due to gall-stones.

4. That the erysipelas was aggravated by the hepatic disease, as Professor Verneuil has several times seen before.

5. That the rapid recovery from the erysipelas commenced from the counter-irritation over the liver and was due to it because the erysipelas, which had been rapidly spreading before its application, suddenly ceased, though it had not been touched by large doses of quinine and purgatives.—*Le Bull. Med.*, p. 883., September 1887.

H. DES VOEUX (London).

VII. A Contribution to the Diagnosis of Venereal Sores.

By M. PAUL THIERY (Paris). A scraping of the surface of the sore is *gently* taken with a blunt knife and placed between two coverslips. Each of these is *rapidly* dried over a spirit lamp, and then allowed to remain for two or three minutes in a solution of "eosine", it is then passed for half a minute into 40% caustic potash solution, washed with distilled water, dried with blotting paper and mounted in glycerine under a magnifying power of from 300-400 diameters.

The discharge from an herpetic or from an infecting sore contains no elastic fibres, whereas that from a soft sore does. This examination will often confirm and sometimes correct the diagnosis of the nature of a sore, but it must not be absolutely relied on.

The author gives tabular results of his method applied in seventy-two cases.—*Le Prog. Med.*, Jan. 1, 1887.

A. F. STREET (Westgate)

GYNÆCOLOGICAL.

I. On Rectocele Vaginalis or Vestibularis. By DR. ED. ROSE (Berlin). In this paper Prof. Rose discusses the treatment

of rectocele vaginalis or vestibularis without prolapsus uteri. The hernial sac of the vagina has here as one of its coverings, the peritoneum, and in every case the peritoneum of Douglas' pouch reaches in its lower limit to the internal sphincter. In order to oppose a permanent barrier to the recurrence of the hernia after reposition, the author denudes the whole posterior half of the vagina as far as the uterus. The wound thus made is united again in a sagittal direction with sutures. The result is a stricture of the vagina which leaves a lumen scarcely the calibre of the small finger. As an additional support of the hernia, the author then performs an episiorrhaphy by which the whole vestibule is closed as far as the urethra. This latter procedure is not to be advised in weakly individuals or old subjects. The effects are apt to be ill borne by the patient. In addition to the above the author reports a case with a peculiar anatomical anomaly. Patient was æt. 46, and was operated on by Prof. Rose for rectocele vestibularis. She had borne one child and there was no rupture of the perineum or prolapsus uteri. The hernia was the size of a closed hand and was easily reposed. During preliminary treatment a small, hard tumor was discovered apparently lying in the anterior wall of the rectal hernial sac. It was about two finger breadths removed from the patulous cervix, and 2 or 3 finger breadths above the lower limit of the plica recto-vaginalis peritonei. After its excision (during the operation for the rectocele) a sound could be introduced into a blind passage for 4 cm., leading upward in the direction of the peritoneal cavity. The tumor itself was consistent, and had the appearance of an infantile uterus. In its center was found a blind canal. It measured 3 cm., in length and 6 c m., in circumference. It was composed of smooth muscle tissue, and the canal in its interior was filled with detritus granules and lined with a variety of decidua, the nature of whose structure the author has not determined. After a careful comparison of anatomical facts and the literature on the subject (Breisky, Malpighi, Gärtner, Kobelt, Kiwisch, Bois de Loury, Freünd, Veit. etc.) the author concludes that the above was a case of didelphys (double uterus). Here the left side of the uterus remained undeveloped and was closed inferiorly. The blind canal leading upward into the peri-

toneal cavity, cannot be looked on as a rudimentary Fallopian tube.
—*Zeitsch. f. Chir.* bd. xxv. heft 6.

HENRY KOPLIK (New York).

II. Salpingitis and Hæmato-Salpingitis. M. TERRILLON (Paris). The author reports three cases. The first is a simple salpingitis extending over 5 years and turning to one of hæmatoma. Complete cure followed laparotomy and the total extirpation of the tube and ovary. The patient got back to a normal state of health and lost all her severe pains.

The second case is one of hæmatoma with extensive salpingitis, in the right side, dating from 5 years back. Laparotomy is performed, the total removal of the pouch is impossible, so it is opened and 500 grammes of blood and 200 grammes of hæmatine are removed. The walls are cleaned, drainage is seen to. In two months the patient is quite cured.

The third case serves to show that palliative measures are not so satisfactory in their results.

A patient is suffering from a right hæmato-salpinx in the right side, dating six years. Since three years ago the tumor has been punctured ten times without any benefit. The pouch becomes refilled at every menstrual period, and the patient's state remains the same, and the pains subsist.—*Le Bulletin Medical*, Sept. 25, 1887.

LEONARD MARK (London)

III. Laparotomy for Rupture of the Uterus with Recovery. By Dr. A. KOETTNITZ, (Zeitz). The patient æt. 29 years had rickets in early youth, learning to walk very late. Married in her twentieth year. A year after passed through a difficult confinement (forceps), giving birth to a dead fœtus and sustaining an extensive tear in the perineum. Two years later a second confinement, also very difficult. Forceps of no use and cephalotripsy performed. Vesico-vaginal fistula; cured by operation three months later. Two years after this she aborted at the end of the second month, losing considerable blood. When she was first seen by author she was five months gone. The measurements of the pelvis were: Conjug. diag. 10.0 cm.; Cr.

ilei 27.5 cm.; Sp. ilei 24.0. Patient was anæmic but otherwise appeared strong. Artificial premature confinement was advised, and patient told to return in three months. In consequence of a railway journey and attendant excitement two months later, however, pains began *i. e.*, in the seventh month. These pains becoming very severe the author was sent for, and found the patient in a deplorable condition, very pale, the pulse scarcely perceptible and very frequent. There was great pain in the abdomen. Examination showed beyond doubt that rupture of the uterus had occurred. After an unavoidable delay of nearly three quarters of an hour, the abdomen was thoroughly cleansed and disinfected, and incision in the linea alba from the navel nearly to the symphysis was made. An immense quantity of blood and liquor amnii gushed out. Extraction of fœtus. The placenta was finally removed with great difficulty. Hæmorrhage was very great. The cervical passage was closed tightly by cicatricial contractions and was opened by the finger through the vagina, for the escape of secretions. Closure of abdominal wound with silk sutures. Drainage by means of a rubber tube placed in the lower angle of the wound. Dressings of iodoform gauze, etc., a rubber bandage being wound about the abdomen and drawn tight above the uterus. The drainage tube wrapped up in a mass of iodoform gauze, and together with the thighs, genital and gluteal region, enveloped in sublimated wool. Treatment consisted of stimulants, secale cornutum and opium.

Patient was somewhat stronger the next day. Vomiting allayed by solution of cocaine and cracked ice internally, and injections of morphine and atropine, so that some nourishment could be retained. Dressings changed on the fourth day and found saturated with blood. Drainage tube removed and a piece of iodoform gauze substituted. The wrappings of sublimated cotton changed several times daily. Fever disappeared in two weeks. Patient was up and about in five weeks after operation. She is at present in the best of health.—*Deutsch. Med. Wochenschrift*, Jan. 12, 1888.

C. J. COLLES (New York).

IV. Successful Primary Laparotomy for Extra-uterine Pregnancy. By S. C. GORDON, M.D., (Portland, Maine). A woman, æt. 33 years, had advanced three months in gestation which had been diagnosed as extra-uterine. Severe abdominal pain, profound shock and extreme collapse having appeared, rupture of the sac was indicated. About sixteen hours¹ later, the patient having reacted to a certain extent, laparotomy was performed and a ruptured gestation sac of the left Fallopian tube discovered. The tumor and blood having been removed and the abdominal cavity thoroughly cleansed, the wound was closed and dressed, and the patient passed on to an uninterrupted recovery. This is the second case of this kind on record in the United States, the first being Johnstone's recorded in the *ANNALS OF SURGERY*, vol. iv, page 95.—*N. Y. Medical Journal*, Feb. 4, 1888.

JAMES E. PILCHER (U. S. Army).

V. The Necessity for the Operation for Myoma of the Uterus. By Prof. ED. ROSE (Berlin). The author presents an additional case illustrative of the value of early interference in these tumors and the dangers of the contrary course. The details of Listerism demand indeed great patience, watchfulness and conscientious execution of technicalities from not only the surgeon but his assistants and nurses, and lastly the manufacturers of the various requisites (catgut gauze, etc.). It is not surprising, therefore, that in large clinics some misstep in the above details should thwart the effort of the surgeon. Yet this occasional failure should not justify so radical a rejection of the operation as some Berlin surgeons of the older school would propose. Rose in a former paper¹ pointed to the dangers resulting to the patient if these tumors are allowed to attain too great a size. By their large size they encumber the thoracic organs in their functions. Dilatation of the right ventricle results with also atrophy of the diaphragm. If the tumor which now nails our patient to her bed be removed, she cannot escape the danger of imminent asphyxia. Again the hæmorrhages from the uterus exhaust the strength of the patients. Lastly repeated attacks of ascites bring orthopnœa and danger of death from asphyxia.

¹*Zeitsch. f. Chirurgie*, Band xix.

The menopause does not always bring the hoped for relief to the patient. Many of these tumors grow to enormous dimensions after the limit of the menopause.

A danger hitherto unnoticed in these cases is illustrated by the following case of the author. Patient 45 years of age, had been in perfect health and menstruated regularly and normally, felt herself in good health but had noticed her increase in size. Advised of the nature of her trouble by her physician she consulted Prof. Rose. There were none of the usual symptoms of myoma uteri, and the patient thought rather lightly of the matter. Under narcosis the uterus was found large and the seat of multiple myomata. The organ was subsequently removed and weighed seven pounds. During removal however in attempting to lift the tumor outside the abdominal incision, a blood cyst (intra-canalicular hæmatoma) of the right tube was discovered adherent to the right side of the pelvis and fixing the uterus. Attempts at ligation of the sac burst the same. The sac burst at a thin portion already the seat of a beginning perforating peritonitis. If in the light of the apparent absence of symptoms this patient had been left alone, she would have certainly died of septic peritonitis due to rupture of the blood sac. The above changes leading to perforation were present, though a communication between the cyst and the uterine cavity was demonstrable. Neither abdominal pressure nor that of the walls of the cyst were sufficient to empty the sac and ward off perforative changes. In connection with this subject the author calls attention to the cases of hæmatometra. Here the formation of these hæmatomata should argue an early interference in all cases. In these cases we must also look for another explanation of the existence of these blood cysts of the tube. The old theory of the closure of the normal outlets for the menstrual blood and the subsequent accumulation and stagnation of the same in the uterus and tubes, would seem insufficient in the light of the above cases.—*Zeitschr. f. Chir.* bd. xxv, hft iv and v.

HENRY KOPLIK (New York).

REVIEWS OF BOOKS.

TRAITÉ DE CHIRURGIE DE GUERRE. By E. DELORME. Medecin-Major de 1^{re} classe. Professeur de clinique chirurgicale et de blessures de guerre au Val de Grâce. Tome premier. Histoire de la chirurgie militaire français, plaies par armes a feu des parties molles. Avec 93 figures dans le text et une planche en chromo-lithographie, pp. viii, 668. Paris, Felix Alcan, 1888.

TREATISE ON MILITARY SURGERY. By E. DELORME, Volume I.

The work, of which this is the first volume, promises to be a very excellent piece of literary work, evidently written by a surgeon who does not disdain to combine scholarship with practical dexterity. Fairly bristling with references to literature, the author has drawn his inspiration from all sources, the most important of which is the vast storehouse of military surgery comprised in the surgical volumes of the Medical and Surgical History of the War of the Rebellion, which is already out of print. Unquestionably the most valuable work ever issued by our government, it touches our national pride all the more deeply to learn that, former editions of the latter work having been exhausted, there is no prospect of a new one being produced. It is to be hoped, however, that the minds of our legislators, may at no distant day be so fully impressed with the usefulness of this mighty treatise that a new edition will be the natural outcome. And we trust that the admiration and respect with which it is regarded by foreign surgeons will be a powerful factor in securing this happy result.

Half of the first volume or nearly one quarter of the work of Delorme is occupied by a history of French military surgery which is of great interest and value. In fact the entire work gives evidence of profound erudition, but it does not impress us as being particularly accurate nor eminently practical. A believer in aseptic surgery, his account of its applications to the surgery of war is incomplete and unsatisfactory. When he comes down to the surgery of particular organs, his work is better and perhaps as good as any. While then it would be a matter of regret were this book of Delorme's to be considered the *ne plus ultra*

of military surgery, it is an excellent digest of much that is valuable, and will be found exceedingly useful by medical officers of the public services.

THE SURGEON'S POCKET-BOOK. An essay on the best treatment of wounded in war; specially adapted for the public medical services. By Surgeon-Major J. H. PORTER, Late Assistant Professor of Military Surgery, Army Medical School, Netley. Third edition, revised and edited by Brigade-Surgeon C. H. Y. GODWIN, Assistant Professor of Military Surgery, Army Medical School, Netley, 12 mo. pp. xx, 257. Philadelphia, P. Blakiston, Son & Co., 1887.

It is impossible for the military surgeon to carry with him into the field ordinary works of reference upon military surgery and hygiene, and consequently a suitable *aide-memoire* is a strongly felt necessity. Such a work should not attempt to comprehend the entire domain of military medicine, but it should consist of a concise presentation of the action demanded by the emergencies of field service. It should cover briefly the chief points in the organization of the field sanitary corps, the transportation of the wounded and the construction of camps and field hospitals, in addition to the treatment of wounds and camp diseases. The text must be carefully pruned of all unnecessary verbiage and as many ideas can be presented more clearly in pictorial form, illustrations should be profusely employed. And it is of prime importance that the book should be small in size, so as to be conveniently carried in the medical officer's pocket.

The essay of Surgeon-Major Porter, first issued in 1875, more fully met the demand than any work that had hitherto appeared, and a revision of the second edition by the author and of the third edition by Brigade-Surgeon Godwin, has vastly improved it. The Introductory General Remarks are devoted mainly to the subject of the transportation of the wounded, and comprise decidedly the best presentation of conveyance by human bearers that we have seen, the portion relating to extemporized litters being particularly complete, although it would be greatly improved by the addition of methods of carrying the wounded without assisting apparatus. Chapters on fractures and splints faithfully portray the best methods of dealing with these accidents, while the subject of wounds is introduced by an excellent epitome of the applications of antiseptic principles to this part of the military surgeon's work; after which wounds of various organs are considered in detail. Amputations are discussed very much after the usual fashion and the procedures illustrated by the cuts commonly used

for that purpose. It would have added greatly to the utility of the book had a series of anatomical sections suitably colored to show the location of the principal vessels at the chief points for amputation, been introduced here. The same may be said of the section upon the ligation of arteries; it is particularly in connection with these operations that the surgeon needs something to recall the surrounding anatomical details, a need never so deeply felt as in the field and at a distance from his books. The lack of a series of illustrations indicating the location of the proper incisions and the anatomical relations is a weakness that admits of an easy remedy; if the latter were shown in colors, as has been done in a number of recent works upon anatomy and surgery, the value of the work for rapid reference would be vastly enhanced.

After good sections upon tetanus, gangrene, osteo-myelitis and scurvy, he presents some brief notes upon foot-soreness, the treatment of the drowned by Marshall Hall's and Sylvester's methods, the selection of cooking places and the construction of latrines, together with some practical remarks on water and rations. In appendices are contained a formulary, a list of antiseptics contained in the various supply cases of the British army, a copy of the recent order to the German army, containing instructions for the preparation and application of sublimate bandages, etc., with some suggestions as to food supply. By using thin paper and small type, the bulk of the book has been greatly reduced, and, while severe criticism would remark upon a number of points susceptible of improvement, taken as a whole the book is thoroughly well adapted to the wants not only of the military surgeon but to the isolated practitioner, whose resources are often taxed at points remote from libraries or other professional assistance.

JAMES E. PILCHER.

MANUEL DE TRACHEOTOMIE. Par le Dr. PAUL RENAULT.

MANUAL OF TRACHEOTOMY. By Dr. PAUL RENAULT.

This excellent little book, published after the author's death, deals only with tracheotomy for croup. The object is not to introduce any new method of procedure, but to describe clearly and methodically the indications for the operative interference, the operation itself and the precautions to be afterwards adopted. A chapter is added on the various complications that may occur. The value of the work consists in its being the result of the author's own observation and practical

experience whilst acting as resident in the Paris hospitals. As such it is necessarily somewhat dogmatic. This we conceive to be rather an advantage than a blemish. The book is intended as an aid to the general practitioner, or to the newly appointed resident in a hospital, when called upon to act for the first time in a case of diphtheritic croup, and for this purpose it is better to lay down clearly certain lines of procedure, rather than to confuse the beginner with many alternative methods.

The first chapter deals with the indications for tracheotomy in croup, and the time for operating, and the contra-indications. The author declares his preference for operating late, and gives the following reasons:

1. That late operations are as successful as early ones.
2. That if the surgeon have patience about 1 in 10 requires no surgical interference, but recovers without it, and that we thus avoid the risk attending operation which he considers greater than is usually stated.

Without entering into the question of the risk involved in the operation itself, it is clear that if the first proposition is true, he has established his point; but this we cannot grant. We are firmly convinced, on the contrary, that, as in hernia, a great proportion of the unsuccessful results are due to delay in operating. More stress is rightly laid on the labored breathing than on the severity of occasional attacks of dyspnoea, as indicating the necessity of operation.

Chapter II is devoted to a rapid sketch descriptive of the operation of tracheotomy as practised by Trousseau (low operation), Bourdillat (high operation) and Saint Germain (laryngo-tracheotomy), these being the only methods that the author considers worthy of notice.

Trousseau's operation is condemned on account of excessive slowness and hemorrhage, and that of Saint Germain is only considered suitable to experienced operators and in exceptional cases. The preference is therefore given to Bourdillat's operation, slightly modified in the direction of that of Saint Germain.

Chapter III. deals with preliminary arrangements, assistants, room, table, light, instruments, etc. It is an admirable chapter and deserves careful study.

Chapter IV. is devoted to a detailed description of the operation, with a commentary on the same. This description is clear, concise and leaves little to be desired, and is followed by a commentary which, if somewhat lengthy, fills in every particular and impresses each point forcibly on the memory by explaining the reason for it. The greatest

stress is rightly laid on the absolute fixation of the larynx during the whole time of the operation. not by a hook, but by seizing the thyroid cartilage between the thumb and middle finger of the left hand, the index finger being used to mark the lower border of the cricoid cartilage.

Chapter V. describes faulty operations. Several important hints are given in this chapter. Amongst others attention is drawn to the fact that the isthmus of the thyroid may be divided with absolute impunity.

Chapter VI. deals with accidents during operation, and chapter VII with after treatment. This chapter is perhaps the best in the book, and gives a number of most valuable particulars respecting food, warmth, protection of the tube and way of removing the tube, etc.

Chapter VIII., and last, treats of various complications which may occur, of which the most important is broncho-pneumonia. There is much in these last two chapters that deserves special notice; but enough has been said to indicate the value of this treatise, which we cordially commend to the medical practitioner.

BENJ. WAINWRIGHT.

ST. BARTHOLOMEW'S HOSPITAL REPORTS. Edited by W. S. CHURCH, M.D., and W. J. WALSHAM, F.R.C.S. Vol. XXIII., London: Smith, Elder & Co., 1887.

The surgical part of this volume contains, as usual, some contributions of great value. In fact, it is rather better than usual.

Mr. Butlin describes in detail two cases of cancer of the breast which he treated with caustics. The skin was destroyed with Vienna paste, *i. e.*, equal parts of caustic potash and caustic lime well powdered and made into a paste with alcohol. The deeper parts were burnt with Bougard's paste, of which the formula is :

Wheat flour,	-	-	-	60 grammes.
Starch,	-	-	-	60 "
Arsenic,	-	-	-	1 "
Cinnabar,	-	-	-	5 "
Sal ammoniac,	-	-	-	5 "
Corrosive sublimate,	-			0.5 centigrammes.
Solution of zinc chloride at 52°,				245 grammes.

All the ingredients, except the last, are separately ground and reduced to fine powder; they are then mixed in a mortar of glass or china, and the solution of chloride of zinc is slowly poured in, while the

contents are kept rapidly moved with the pestle so that no lumps may be formed. The soft homogeneous mass is poured into an earthenware pot with a cover, and may be kept for several months.

Bougard's instructions as to the mode of using the paste were followed in the treatment of Butlin's two cases.

Both patients were old women. In both the disease was removed, locally at least, and cicatrization followed. In one the temperature rose during four days, twice reaching 103° or 104° .

Mr. Butlin regards it as beyond question that the treatment by caustics is less dangerous to life than that by the knife. We should say this depends upon circumstances and persons.

For protection of the surrounding skin Butlin recommends soap plaster. In conclusion he urges that caustic should be used far more frequently in surgical practice than it hitherto has been, especially, he thinks, it should be used in cases in which there are reasons to dread a surgical operation, and that in many other cases patients should be given the choice between caustics and the knife, setting before them as clearly as possible the amount of risk to life on the one hand, the pain and slow course of treatment on the other.

He compares the caustic-using quacks to the bone-setters, and thinks there is a great deal to be learnt from both. In the matter of roguery and wholesale systematic lying no doubt there is.

Dr. Herringham's case of tumor of the cerebellum, with his remarks on it, will interest surgeons by its bearings on the diagnosis of head injuries and tumors.

Dr. Goodsall gives notes of twenty cases of foreign bodies in the rectum, and draws from them a number of very definite conclusions. See index of surgical progress.

Mr. Walsham has an elaborate and able article on nasal obstruction and its treatment.

Mr. Marsh writes on the association of suppuration with malignant disease.

Mr. Thomas Smith adds three cases occurring in the same family to the literature of the affection known as "multiple polypi of the lower bowel."

Mr. Willet has been experimenting very successfully with the hot water bath used continuously for cases of long standing suppuration with surgical hectic. His cases, reported by Messrs. Cholmley and Davidson, must help those of the Liverpool surgeons, published last year to bring into more general use an exceedingly neglected but valuable remedy.

Not the least valuable parts of the book are the elaborate and well analyzed reports, chiefly statistical, of the hospital registrars, Dr. West and Mr. Bowlby.

C. B. KEETLEY.

ANATOMY, DESCRIPTIVE AND SURGICAL. By HENRY GRAY, F.R.S., Lecturer on Anatomy at St. George's Hospital, London. Edited by T. PICKERING PICK, F.R.C.S., Examiner in Anatomy, Royal College of Surgeons of England. A new American from the eleventh enlarged and improved London edition, thoroughly revised and re-edited by WILLIAM W. KEEN, M. D., Professor of Anatomy in the Pennsylvania Academy of the Fine Arts, etc. To which is added the second American from the latest English edition of Landmarks, Medical and Surgical, by LUTHER HOLDEN, F.R.C.S. In one imperial octavo volume of 1099 pages, with 685 large and elaborate engravings on wood. Philadelphia, Lea Brothers & Co., 1887.

The new edition of Gray's Anatomy affords us a great deal of pleasure. The work has always been a popular one with students, rather because of its systematic arrangement and the distinctness of its illustrations than from any distinctively literary merit, however. The text was bald and unattractive, and in this respect it compared unfavorably with similar works by other English anatomists, but it excelled in its pictorial representations. We believe that Dr. Carter has never received the portion of the credit properly due him for the success of the work. While not possessing the artistic merit of Wandelaar or Bidloo, nor the minuteness of Henle, or Cruveilhier, they present the peculiar quality of instructiveness to a remarkable degree. His plan of directly lettering the delineations of organs, instead of indicating them by references, is so clearly the best possible method that it is surprising that it has not been universally adopted. The original number of engravings has in the present edition been more than doubled by judicious addition from the best work of other artists, and the feature of indicating the arteries, veins, nerves and the muscular attachments in colors, has been adopted.

The editorial work in this edition has been extensive and searching. A notable improvement consists in the substitution for the Introduction of former editions, of two sections on General Anatomy and Reproduction, respectively, in which each of these subjects has been brought up to date. The bones, muscles, joints, vessels and viscera all bear evidence of minute editorial scrutiny, but in the chapters upon the ner-

vous system the most extensive alterations have been made. The antiquated nomenclature of Willis for the cranial nerves has at last been abandoned for the more practical one of Soemmering. The sections upon the brain have been very unsatisfactory, and we were glad to see that Dr. Keen has rejected a number of the English cuts, substituting more recent and accurate ones for them, and altering the text to correspond. He has also enriched the work by the addition of an entirely new section on cerebral localization and topography. By the thorough revision which it has received, the work has been brought fully abreast of the times and will, doubtless, continue for many years to be the leading text book upon the subject.

JAMES E. PILCHER.

PROCEEDINGS OF THE MEDICAL SOCIETY OF LONDON. Vol. X, 1887.

Edited by SAMUEL WEST, M. D., and BERNARD PITTS, M.A.,
F.R.C.S.

To merely enumerate the interesting cases, papers and short abstracts of remarks made in the discussions on them, contained in this book would require space equal to about one half the ten pages occupied by the index to it. The medical society meets every week, and there are frequently half a dozen cases shown in the same evening.

The most important discussion recorded in the volume is that on a paper by Mr. Lawson Tait, "On Removal of the Uterine Appendages," in which, among others, Messrs. Thornton, Doran, Bantock, Heywood Smith and Imlach took part.

C. B. KEETLEY.

GUNSHOT WOUND OF STOMACH AND LIVER TREATED BY LAPAROTOMY AND SUTURE OF VISCERAL WOUNDS, WITH RECOVERY.

By H. C. DALTON, M.D.,

OF ST. LOUIS, MO.

SUPERINTENDENT OF THE CITY HOSPITAL.

LOUIS Prentice, colored, æt. 22, entered the hospital at 12:30 A. M., December 24, 1887. He stated that one hour before admission he was shot with a pistol of 38 calibre at a distance of four or five feet, that, as the shot was fired, he turned his left side toward his opponent, and leaned over toward the right. His assailant was sitting on a bed about two feet high. He was not knocked down by the shot, nor did he experience much pain from it, but felt a peculiar burning sensation at the site of the wound. He was driven a mile and a half over a rough macadam road after the injury.

I was notified at once upon his arrival, and found him with a pulse of 82, good volume, respiration 24, temperature 98.8° F. There was no tenderness except at the point of entrance of the bullet; there was no shock. When he was put upon the operating table I noticed a chancroid on corona glandis, which, he said, he had first discovered three days before, and four days after connection. The left inguinal glands were swelled, hard and tender. Patient's appearance was indicative of robust health; he had never been sick except with intermittent fever and small-pox.

The wound of entrance was about five inches to the left of the median line, and two inches above the umbilicus. Believing it to be my duty to see where the ball had gone, and what damage it had done, I concluded to operate, rather than put my patient's peritoneum in an opium splint and let him die. After observing strict antiseptic precautions I enlarged the wound, and, following the bullet track, found that the bullet had traversed the subcutaneous tissues two inches before entering the cavity. Stuffing the wound with iodoform gauze, and bring-

ing its edges together with one stitch over the gauze to hold it in place temporarily, I made an incision in the median line from the ensiform cartilage to the umbilicus. Two holes were found in the stomach, the one of entrance being on the anterior surface about three inches directly below the cardia; the hole of exit was on the superior portion of the stomach, just at the junction of the anterior and posterior surfaces, and about an inch and a half from the pylorus. The bullet plowed through the lower margin of the left lobe of the liver at a point an inch and a quarter from the fissure, leaving a V-shaped wound a half inch in depth. I expected to find that the bullet had passed on

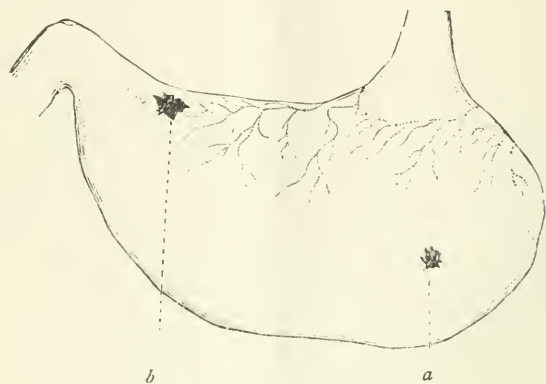


FIG. 1. GUNSHOT WOUND OF THE STOMACH.

- a.* Wound of entrance.
- b.* Wound of exit.

through the abdominal wall, but the wall was intact. It would have been better for him had such been the case, for it would have added very materially to his chances of recovery, as the uncertainty of the thing compelled me to examine the entire intestinal tract, as well as all the viscera. The intestines, as fast as taken out, were wrapped in cloths wrung out in hot sterilized water—water that had just been thoroughly boiled. The bullet was not found, but there was a slight contusion on the upper surface of the transverse colon, near the hepatic flexure. Billroth says these contusions are nearly always caused by spent balls, balls which have not sufficient momentum to overcome

the resistance of the soft parts ; if he was correct, the bullet was, doubtless, loose in the abdominal cavity. I did not think the contusion was sufficient to cause sloughing, hence did not deem it necessary to excise it. The wounds in the stomach were closed with Lembert's sutures, three in the wound of entrance and four in the wound of exit. The finest iron dyed silk was used in the smallest quarter curved needle, *i. e.*, the kind usually used by oculists. The wound of the liver



FIG. 2. GUNSHOT WOUND OF THE LIVER.

a. Wound of the liver.

b, c. Points of insertion of the suture.

was closed by one catgut suture, large size, the point of entrance and exit of suture being an *inch* from the margin of the wound, and entering deeply into the liver substance, probably an inch or more. This precaution was taken on account of the great friability of the tissue. It acted well, bringing the wound together snugly.

There was considerable hemorrhage from the visceral wounds, especially from that of the liver, which did not cease until they were sutured. The abdominal cavity was flooded with sterilized hot water, and special attention paid to the toilet of the peritoneum. The bullet wound of peritoneum was closed by continuous catgut suture. The visceral wounds were dusted with iodoform, and the cavity closed with heavy silk interrupted sutures, placed about a half inch apart. The stitches were inserted a half or three-quarters of an inch from the line of incision, and involved the integument, muscles, peritoneum, etc. The wound of the abdominal wall, at entrance of bullet, after being

washed with a 1-1000 solution of bichloride of mercury, and iodoform dusted on, was closed by continuous catgut suture.

The whole abdominal surface was then thoroughly washed with a 1 1000 bichloride solution and the dressing applied in the following order :

First, Lister protective ; second, iodoform gauze ; third, absorbent cotton ; fourth, gutta percha tissue ; fifth, cotton bandages, and, sixth, wet crinoline bandages.

The patient coughed a great deal during the operation and vomited four or five times a thick, black, grumous fluid, necessitating turning him on his side each time, which was awkward with an open belly, and to add to the trouble, his nose bled freely. This was very annoying, and I was afraid would add to the gravity of the case. As soon, however, as the ether was discontinued and chloroform given, these troublesome complications ceased. Operation lasted two hours. Patient was given a fourth of a grain of morphine and put to bed, with hot bottles packed around him.

Two hours after the operation his pulse was 84, temperature 99°, respiration 30. His urine was drawn by catheter for several days after the operation. Strict orders were given not to allow him a particle of food, water or ice. Nor did he take a thing into his stomach for four days, when he eluded the vigilance of his nurse, walked across the ward, and drank a tumblerful of ice water. Neither the walk nor the water injured him in the least.

Forty-eight hours after the operation I commenced nourishing him by enemas of peptonized milk. He did not complain of thirst until thirty-six hours after admission, when I adopted the plan advocated by Greig Smith, *i. e.*, gave him a pint of warm water by enema as often as he complained of much thirst. It was rarely ejected and seemed to assuage his thirst. I had not tried it before, and was much pleased with its action.

Thirty hours after the operation an accident happened which came near costing my patient his life. He had been worried for some hours with hiccough, and as we had had good results on the medical side of the hospital in giving sulphate of hyoscyamine to patients with this distressing affection, my assistant gave him $\frac{1}{120}$ of a grain hypodermically. In less than half an hour his pulse rose to 160, and was extremely weak ; he became unconscious and, in fact, was almost in a collapsed condition. His temperature, which before the injection was 99.2° F., arose to 101.6° F.

He was given whiskey, tincture digitalis, and morphine hypodermic-

cally, and hot bottles applied to extremities, which in about two hours restored him to consciousness. after which he rallied rapidly. His temperature and pulse fell in a few hours, and neither again reached 100. We had given patients larger doses of hyoscyamine without the least unpleasant effect. Lauder Brunton gives the dose as $\frac{1}{60}$ of a grain to 1 grain.

The patient was annoyed occasionally with a hacking cough which gave him considerable pain. About the fifth day I caught him forcing his hand underneath the dressing, scratching the wound. I immediately removed the dressing under constant irrigation of a warm 1-1000 solution of bichloride, and found it to be in good shape, almost entirely healed by first intention, with the exception of about an inch at the superior portion of the median incision. This was sweet, and gave no indication of suppurating. The wounds were dressed with as thorough antiseptic precautions as at first. On the fourth or fifth day afterwards we discovered a sour odor, and upon examination found the wound suppurating.

I was, of course, very much chagrined, as it is quite the exception for us to have a suppurating wound, and I can but attribute it to the interference of the patient. He was constantly pulling at the dressing, complaining of its being too tight.

He was not given food by the stomach until the tenth day, when, complaining for the first time of being hungry, he was fed beef tea made from Cibil's Ext. of Beef. This was followed in two or three days by chicken broth. He was not allowed solid food until the eighteenth day. He, doubtless, could have taken it without trouble much earlier, but I wanted to make "assurance doubly sure," and hence made haste slowly. He was up and around on the twentieth day, and was discharged well on February 2, 1888. I saw him a few days since, and found him in robust health.

Given a case of gunshot wound of the abdomen the surgeon is face to face with one of the most serious and formidable conditions he is ever called upon to treat. He must remember that caution should be the surgeon's watchword when he treads the peritoneal region. To operate, or not to operate, is the question which has been agitating the minds of the surgeons of the world, and, I believe, it is safe to say that the vast majority of them believe it better to give the patient the benefit of the doubt, and to operate, rather than hug the de-

lusive phantom of hope that *perhaps* the ball did that almost impossible thing—went through the abdomen without hitting the intestines or wounding important viscera.

Those who would call a halt in laparotomy for gunshot wounds of the abdomen have little to offer but the mortality tables of the past. The percentage of recoveries has been much greater since the introduction of laparotomy, and that, too, when the operation is in its infancy. How much greater will be our success when we learn more about the technique of the operation, and are better judges of the indications, as well as contra-indications, for the same? By the use of antiseptic and aseptic surgery, we are enabled to invade the abdominal cavity with far greater impunity than formerly. I believe with Senn that we should perform laparotomy in all doubtful cases for the arrest of hemorrhage, removal of extravasations, or the restoration of a breach of continuity.

Prof. Dennis says: "Bearing in mind the difficulty of diagnosing the extent of the injury, and the inevitable fatal result of leaving to itself any perforation of the intestinal tract, and, holding that laparotomy performed with strict antiseptic precautions is not a *very* serious operation, I would advocate the procedure in doubtful cases as a diagnostic measure, and for the purpose of exploring thoroughly the contents of the abdominal cavity."

I attribute the fortunate results in this case to several things, first, the age of the patient, 22 years old; second, his color, for it has been demonstrated that the negro recovers from injuries of all kinds better than his Caucasian brother; third, the promptness of the operation—two hours after the injury; fourth, the strict antiseptics; fifth, the skilled and drilled assistants and attendants, and all the necessary paraphernalia of a well regulated hospital.

I desire particularly to lay stress on the necessity, when suturing the liver, of placing the sutures a good distance from the edge of the wound, and of carrying them *deeply* into the substance of the liver.

In the annexed table I have given all of Sir William MacCormac's cases, verbatim, with the exception of two which I

was unable to find. and have added others which have occurred since he wrote his article. I have collected from all sources 69 cases with 27 recoveries and 41 deaths—in one, result not given—a grand result, all things considered—especially when we remember that under the “do nothing” treatment less than eight per cent recovered, and it is quite likely that in some of these cases neither the cavity nor the viscera were penetrated.

I have examined all the literature I can find on the subject of laparotomy for gunshot wounds, and have not been able to discover that the liver has been successfully sutured in such cases, and I think I am justified in claiming priority in the matter.

TABLE OF ABDOMINAL SECTIONS FOR GUNSHOT WOUNDS OF THE ABDOMINAL VISCERA.

<i>Operator and Reference.</i>	<i>Age and Sex.</i>	<i>Time after Injury.</i>	<i>Special Symptoms.</i>	<i>Nature of Intra-peritoneal Injuries.</i>	<i>Treatment.</i>	<i>Result.</i>	<i>Remarks.</i>
Abbe. <i>ANALS OF SURGERY, vol. iv, p 475, Dec. 1886.</i>	53	5½ hrs	Slight shock; vomiting, rapid and increasing abdominal pain, tympany.	4 wounds of small intestine; 3 of mesentery; wound between bladder and rectum; perforating bladder; much sub-peritoneal extravasation.	Laparotomy; a pint of greenish serum containing extravasated feces; wounds in small intestine sutured by Lembert's method and also the wound in the bladder; abdomen drained.	Died in 9 hours.	Walked two squares after injury. Post-mortem; purulent peritonitis; ball found in bladder.
W. E. Andrews, <i>Journal A.M.A. 1885, p. 177.</i>	Adult.	16 hrs.	Vomited much blood; moderate shock; diffused tenderness of abdomen.	1 quart of bloody serum.	Laparotomy; bloody serum sponged out; organs examined and wound closed.	R	Operation lasted 2 hours
T. Annandale <i>Lancet, 1885 1. 740.</i>	15	1 hr.	General shock; slight pain in abdomen and pelvis.	Considerable hemorrhage; 5 wounds of small intestine; 2 in colon, 2 in rectum; wound of mesentery.	Laparotomy; all closed with Lembert's sutures.	Died in 24 hours.	Walked 100 yards after injury Post-mortem: all sutured portions were water-tight except the uppermost wound of the small intestine, where 3 openings were situated close together; wounds firm; no others found.
Baudens, <i>Plates d'Anesthésie a feu 1836.</i>	.....	.....	Wound of entrance at umbilicus; exit through quadratus lumborum.	2 wounds of intestine; 1 completely destroying a portion of intestine.	Abdominal wound considerably enlarged; 8 inches resected; Lembert's suture.	Died third day.	Post-mortem; wound of cecum found with fecal extravasation.
Baudens, <i>Guenther, Ochr. A. IV.</i>	.....	.....		Faecal extravasation; wound of transverse colon	Abdominal wound enlarged; intestine sutured.	R	
Briddon, N.Y. <i>M. J. 1887, xlv 75.</i>	.....	12 hrs.	Vomited large quantity of blood; no urgent symptoms	2 slits in great curvature of stomach.	Laparotomy; Lembert's suture.	Died	Post-mortem; 4 other wounds; all within 3 inches, previously escaped notice.

T. Billroth, Prof. Billroth's clinic, 1886 (K. von Hacker reporter.)	F 63	32 hrs.	Collapse; great pallor; small pulse; vomited blood, belly swollen and tender.	Bullet entered beneath left nipple through seventh intercostal space; traversed the stomach near greater curvature.	Laparotomy; wound 6 inches long from linea alba to sixth rib; ends of seventh and eighth ribs resected; contused margin of stomach; wound excised; 29 Lembert's sutures used to close exit wound; 3 sutures sufficed to close entrance wound. Bullet not discovered; abdomen cleared of coagula and drained.	Peritonitis and pleuritis, bullet had wounded liver and aorta, and lodged in the right kidney. Vomiting was continuous; gradual loss of strength.	Death following low-lying continuous; gradual loss of strength.
Wm. T. Bull, ANNALS OF SURGERY, vol. IV, p. 479, Dec. 1886.	22	17 hrs.	Vomiting; pain; rectal tenesmus; involuntary micturition.	Abdomen full of bloody serum; but no faeces; 6 perforating wounds of small intestine; 1 wound of sigmoid flexure.	Laparotomy; bullet wound enlarged afterwards; 27 Lembert's sutures to small intestine; 3 to sigmoid flexure. The larger wounds close together had their edges resected, and all wounds were dusted with iodoform. Laparotomy wound was closed entirely, but drainage tube was placed in bullet wound.	R The ball was found lodged in the peritoneum at the edge of sigmoid flexure and protruding into its lumen.	
Wm. T. Bull, ANNALS OF SURGERY, vol. V, p. 151, Feb. 1887.	24	6 hrs.	Severe abdominal pain; shock vomiting; diminished liver dulness; fluid in abdominal cavity.	Bullet entered behind, and lodged in abdominal wall near umbilicus; 2 wounds of small intestine, and 2 of transverse colon; extravasation into meso-colon.	Laparotomy; incision in abdominal wall and bullet removed; escape of bloody serum and gas. Abdominal section in central line, incision 11 inches; 2 pints bloody serum removed; 2 wounds of jejunum and 2 of transverse colon, sutured by Lembert's method, abdomen washed out.	Died 8 hours. Post-mortem; wounds firmly closed; no other wounds found.	
Wm. T. Bull, ANNALS OF SURGERY, vol. I, p. 479, May, 1885.	57	12½ hrs.	Shock; vomiting; scarcely any pain.	Large amount of blood; left lobe of liver almost divided	Laparotomy; incision from 1 inch below ensiform cartilage to 3 inches above the pubes; abdomen sponged out. Patient died before the operation could be completed.	Died on table Post-mortem; no other wounds found.	

TABLE.—CONTINUED.

Operator and Reference.	Age and Sex.	Time after Injury	Special Symptoms.	Nature of Injuries.	Treatment.	Result.	Remarks.
Wm. T. Bull. ANNALS OF SURGERY, vol. vi. p. 478, Dec '86	25	2½ hrs	Nausea; abdomen appeared normal; only vicinity of wound tender.	2 wounds of small intestine; 3 tears of peritæum; omentum torn.	Wound explored by incision 3 inches long; laparotomy; incision from umbilicus to pubes; abdomen full of bloody serum, which was sponged out; two wounds of small intestine were sutured by nine Lembert's sutures. Iodoform dusted on them. Wound of serous coat of sigmoid flexure was sutured with four Lembert's sutures; vessel bleeding in meso-cæcum was tied; portion of great omentum ligated; laparotomy wound sewn up; bullet wound stuffed with iodoform gauze.	R	
F. T. Dennis, Med. News, 1886, xlviii, 225-253.	23	.....	Shock.	Much blood; wound of liver and its great vessels	Laparotomy; contents of abdomen completely examined; clots of blood carefully removed; abdomen rapidly closed and pressure applied.	Died in 48 hours	Post-mortem; bullet passed through left lobe of liver, injured portal vein and lodged in right lobe.
F. T. Dennis, Med. News, 1886, xlviii, 225-253.	F 26	.....	Slight shock and pain, increased during respiration.	Abdomen full of venous blood 7 wounds of intestine and 1 of mesentery, uncontrollable hæmorrhage from iliac vein; fecal extravasation.	Laparotomy; wounds of intestine sutured; abdomen cleared of blood.	Died in 48 hours.	Post-mortem; abdominal cavity filled with blood; wounds in intestines all water-tight; iliac vein wounded.
J. McF. Gas- ton, M. D., Med. and Surg. Rep. June 12, '86 p. 739.	30	4 days.	Very prostrate, almost pulseless; extreme shock, which continued 3 days; treatment being employed to overcome it.	No peritoneal wounds found beyond the one made by the bullet in anterior abdominal wall; considerable sero-sanguinary effusion undergoing decomposition.	Laparotomy in median line; colon punctured with trocar and cannula to allow of escape of gas; small intestine also punctured 6 times, each puncture sewn up by crucial stitch; abdomen cleansed by sponging; wound closed; drainage tube introduced.	Death	Post-mortem; no wound of intestines found, nor could the bullet be discovered. Operation performed too late.

J. B. Hamilton Jour. Amer. Med. As. '85 ii 202.	19	2½ hrs.	Considerable shock.	11 wounds of small intestine, 2 of colon; omentum and mesentery wounded; abdomen full of blood.	Artery tied; blood removed; Lambert's suture to intestine; wounds ligatured, and the injured portion of the omentum removed.	R	Pelvic suppuration; hematocoele evacuated through rectum on twelfth day.
C. A. Jersey, Med. Rec. Oct. 16, '86.	44	20 hrs	Much shock; pain and tenderness of abdomen.	4 wounds of small intestine, 2 perforations of mesentery, abrasion of mesentery	All wounds except the abrasion stitched with Lambert's sutures.	Died in 19 hours	Post-mortem; mesenteric wounds sloughing and bathed with pus.
A. R. Kinloch, N. C. Med. Jour. 1882, xi	Adult.	11 hrs	Slight shock; general abdominal pain; pain in sacral region, hole in rectum	Much blood and faeces; 5 perforations of intestine 2 of mesentery.	Laparotomy; edges resected and sutured with Lambert's sitch; drainage.	Died in 16 hours	Post-mortem; another wound of the intestine was found.
Same, Jour Med. Asso June 4, 1887.	M 27	2 hrs.	Condition at time of operation fair.	Small intestines and mesentery.	Laparotomy; suture of wounds.	Died	Post-mortem cavity contained some fluid; abscess in mesentery.
Kocher (or. f. Schwartz- er Aertze '83, No. 23	14	3 hrs.	Collapse; signs of peritonitis; pistol bullet perforated near navel; severe abdominal pain; hicough; vomiting; pallor; tympanites.	Much blood; circular wound 1½ inch of large curvature and fundus of stomach; anterior surface; no exit wound; bullet not found.	Laparotomy; suture of wounds, 2 interrupted sutures, then a continuous suture.	R	Abscess followed in track of wound and somewhat delayed recovery.
Jordan Lloyd, Brit. Med. Jour. '83, i 560.	F 19	72 hrs.	Little shock; no vomiting; later constant vomiting; pain and peritonitis.	Much sinking brown fluid; ragged wound of small intestine ¾ inches in diameter.	Laparotomy; intestines stitched to wound.	Died in 2 hours	Post-mortem; mesentery perforated; confusion of bladder not recognized during life.
F. J. Lutz, W. M. Rev '86, p. 514	21	.....	Right side of abdomen tympanitic; left side dull	7 wounds of small intestine, 4 wounds of mesentery.	Laparotomy; Lambert's suture; ligature of a mesenteric artery.	Died in 3 days.	Post-mortem; purulent peritonitis; intestinal wounds in good condition.
F. J. Lutz, unpublished.	M 30	3 hrs.	Revolver shot; condition at time of operation good; pulse 84; temperature 98.5 F.; some pain in abdomen; resonance over hepatic region.	4 wounds in small intestine, 6 in mesentery; profuse hemorrhage.	Laparotomy; Lambert's suture; toilet of peritoneum	Died in 4 hours	

TABLE.—CONTINUED.

Operator and Reference.	Age and Sex.	Time after Injury.	Special Symptoms.	Nature of Intra-peritoneal Injuries.	Treatment.	Result.	Remarks.
A. O. Mackellar, Phil. Dec. 25, '86, unpublished. Notice Lancet '87, i, 37.	22	33 hrs.	Collapse; vomiting; pain; no blood appeared in urine till 12 hours after injury.	Entrance wound to left, and a little below umbilicus; 2 perforations of sigmoid flexure; contusion of small intestine.	Laparotomy; 2 perforations secured by ligatures.	Died in 12 hours.	Nervous recovered from shock of operation; post-mortem; bullet lodged in posterior wall of bladder; small wound of anterior part of rectum; some fecal matter and blood clots in abdominal cavity.
T. G. Morton, Philadelphia, unpublished.	36	1½ hrs.	Some pain; no shock; vomiting blood copiously.	4 wounds of stomach, 1 of transverse colon; omentum much lacerated	Laparotomy; Lembert's sutures to all.	Died in 6 hours.	Post-mortem: wounds and abdominal cavity all right; large hæmorrhage (1½ pint) into left pleura from cut intercostal artery.
C. B. Nancrede Phil. Ac. of Surg. 1886	.....	.....	At first little pain or shock; later copious bloody vomiting.	Perforation of anterior and posterior wall of stomach; 2 large perforations of duodenum	Laparotomy; Lembert's suture; "cleansing"	Died in 3 days.	No post-mortem.
Newall, New Brunswick, Br. M. Jour. Feb. 25, 1882, p. 200.	Adult.	Next day	Accidentally shot himself with shot-gun in median line.	Perforation of intestine by shot; 20 shots passed per anum following day.	Laparotomy; gun-wad and pieces of clothing removed from abdominal cavity	R	3 shots made the rectum 1½ in. above crest of ilium and ¾ in. from spine.
A. V. Parkes, Ch. M. Jour. and F. x. '85, li, 412.	16	22 hrs.	Abdomen tympanitic; no liver dulness.	Great quantity of blood; 1½ inch wound, also groove in small intestine.	Laparotomy; Lembert's suture to groove and perforation.	Died in 15 hours.	Post-mortem; few clots; peritonitis; contused wound of rectum and sigmoid flexure.
Proggoff Langenbeck's, Ar. xxvii, 278.	Adult	.....	Wound near umbilicus; protrusion of intestine.	4 perforations of small intestine.	4 inches resected, also piece of mesentery; 10 Lembert's sutures.	?	Progressed favorably for 4 days then lost sight of.
Pozzi, Rev. de Chir. 1887, i, 78.	13	8 hrs.	Vomiting; bloody urine.	Infiltration of urine; 3 perforations and 3 contused wounds of intestine, wound of bladder.	Laparotomy; 20 sutures were employed; partial resection of gut; drainage.	Died in 52 hours.	Post-mortem; sutures did not yield to injection of water. The symptoms due to the vesical injury were those which chiefly indicated the necessity for operation.

A. C. L. Ramsey, N. W. Jan 1885, iv. 377.	7	6 hrs.	Great pain, much vomiting.	Much blood, extensive wound of duodenum, confusion of colon.	Laparotomy, excision of gut including wound, Lembert's suture.	Died in 1 hour.
T. Richardson, N. O. Med. & Sur. Jour. '86, xiii. 867.	Adult.	9 hrs	Great shock, vomiting, signs of incipient peritonitis.	3 lacerations of intestine, 1 of mesentery.	Laparotomy, all wounds sutured.	Died in 14 hours.
W. W. Seymour, N. Y. Med. Jour. 1886, xlv. 299.	16	13 hrs	Collapse, vomited, some pain down left sciatic nerve.	Acute peritonitis, one quart of bloody fluid in abdomen, 2 wounds in transverse colon a nick in the duodenum and 2 wounds of meso-colon	Laparotomy, incision 7 in. abdomen, washed out clean, 2½ inches of colon resected, the ends joined with Lembert's suture, nick in duodenum closed by 3 Lembert's sutures, glass drainage tube.	Died in 18 hours.
C. T. Parkes, Chicago, Annals of Surg. Nov. 1887.	Adult.	4 hrs.	Revolver shot, moderate collapse, pulse very fast, face pale, considerable bleeding from internal wounds, two bullet wounds 4 inches to left of median line in a line one above the other, and 1½ inch apart, one had passed out of the body below last rib at outer side of erector spinæ.	Five perforations of small intestine, perforation of left kidney, no special bleeding from it, vomited much food during operation.	Four-inch median incision, much blood removed from peritoneal cavity, kidney not removed, antiseptic dressings, rallied well from operation but died of bleeding from kidney.	Died about 24 hrs after operation.
C. T. Parkes, Chicago, Ibid.	45 M	16 hrs.	Blush over right half of abdomen, breathing entirely thoracic, the abdominal walls hard and motionless.	Bullet wound 2 inches inside right iliac spine, much fecal matter in wound, bullet had just entered and left the abdominal cavity and buried itself in the thigh.	Incision in median line, and large quantities of stinking ichor, fecal matter and food evacuated, washing with weak boric acid lotion, intestines much inflamed, one large wound of small intestine found and sutured without difficulty, the whole in estival tract examined, no further lesions found.	Died 16 hrs after operation.

Post-mortem, no other wound found, no fluid in abdomen, wounds of intestine firmly closed, did not yield to injection of water; surgeon's opinion that an earlier operation would have been successful.

The wounds had been easily secured and both they and the abdominal cavity were in a satisfactory condition, post-mortem.

Apparently death was due to shock.

TABLE—CONTINUED
Nature of Intra-peritoneal
Injuries.

Operator and Reference.	Age and Sex.	Time after Injury.	Special Symptoms.	Nature of Injuries.	Treatment.	Re-sult.	Remarks.
T. A. McGraw Chic. Med Jour. and Exam. July 1887.	F 24	9 hrs.	Pulse 120, respirations 30, great pain, moderate bloating, 32 calibre bullet.	2 holes in ascending colon, 2 faces in cavity, bullet entered 2 inches above and 2 inches inside of right anterior superior spine of the ilium.	Laparotomy, sutures were Czerny's modification of Lembert's method. Incision at site of wound.	R	
J. B. Murphy, Jour. Amer. Med. Ass'n.	26 M	.....	But little shock, pulse 90, temperature normal, no pain.	11 openings in small intestine.	Laparotomy, median incision 3 1/2 inches long. Cleansed peritoneal cavity with warm 1/2 per cent carbolic water, continuous catgut suture to intestinal wounds.	Died	Post-mortem, abdomen filled with blood, suture in post- peritoneal wall torn through large quantity of blood in retro-peritoneal region, opening in left renal artery, from which the hæmorrhage came, intestinal wounds completely united, both air and water tight.
J. B. Murphy, Jour. Amer. Med. Ass'n.	22 M	2 hrs.	Some shock, pulse 66 of good volume, dulness in the lower portion of abdomen, wound 2 inches to right of median line.	Abdomen full of blood, about 2 pints, bullet passed through abdominal wall into the margin of liver, passing through its substance almost directly backwards, and into the muscles of the back, there were no perforations of stomach or bowel.	Laparotomy, toilet of peritoneum.	R	This was a negro boy.
J. B. Murphy, Jour. Amer. Med. Ass'n.	57 M	3 hrs.	Pulse 78, full and strong, no shock.	Bullet passed through liver 3/4 of an inch from its lower margin, also perforating the transverse colon, passed on into the muscles of the back an inch to the right of spine	Laparotomy, bridge of intestines between the 2 openings cut through, edges of wound freshened making the opening about 1 1/2 inches in length, muscular and muscular layers were first united with a continuous catgut suture peritoneal covering was then sewed over it with a continuous catgut suture, about 1/2 drachm of fecal matter escaped after opening was enlarged, abdomen cleansed with boric acid solution	R	

J. B. Murphy, Jour. Amer. Med. Ass'n.	26 M	.....	Bullet wound right side nearly in axillary line just below the costal cartilages, patient suffering profoundly from shock, had walked 2 blocks after being shot.	Bullet notched the anterior margin of the liver in its downward course, 2 wounds in stomach, extravasation of food into the abdominal cavity, 1 wound in mesentery.	Laparotomy, wound of stomach and mesentery sewed up with deep and superficial catgut sutures, abdomen washed with warm solution of boric acid, rubber drainage tube passed through wound on the right side.	Died.	Through an error patient was given two hypodermic injections of $\frac{1}{2}$ of a grain of morphine and showed severe symptoms of opium poisoning, did not become unconscious until 8 hours after the operation, autopsy showed abdomen clean and no blood in it.
J. I. Skelly, Potomac, Annals of Surg., July 1897, p. 49.	21 M	A few minutes	Six wounds, that is of both hands, right hip, and abdomen, very pale, great pain in right iliac region.	No wound of intestine, bullet imbedded near the spine, 4 inches below the umbilicus, and had passed upward for about 3 inches.	Chloroform, median laparotomy, no complete antiseptic could be provided, intestine drawn out held in warm towels (not aseptic), abrasion of peritoneum, dusted with iodoform, abdomen wiped out with new sponge hastily cleansed in carbolic acid and rainwater.	R	Patient distinctly tuberculous with tubercles in peritoneum and a cavity in right apex, no bad symptoms during convalescence which was rapid.
A. E. Barker.	23 M	3 1/2 hrs.	Shock, slow diastolic pulse, great tenderness of abdomen.	Bruise of liver and slight tearing of the omentum, clots of blood, bullet and wound removed from the latter.	Median laparotomy under spray, etc., thorough exploration of abdomen, bullet and wound found entangled with clots in omentum below colon, toilet of peritoneum.	R	The slow diastolic pulse probably a normal condition, it lasted all the time patient was in hospital.
A. E. Barker.	37 M	5 hrs.	No shock, no pain, very little bleeding, nature of wound only discovered on enlarging bullet track.	Double perforation of ilium 3 feet above caecum, abdomen on right side contained much blood and clots no faeces or gas.	Wound much enlarged, perforation of parietal peritoneum sutured, perforated portion of gut excised completely, and ends of bowel brought together by continuous suture of fine silk, reinforced by row of interrupted suture, abdomen sponged out.	Died.	Peritonitis and pneumonia found post-mortem but to a moderate extent, suture of bowel was perfectly competent, and sound union had taken place.

TABLE—CONTINUED.

Operator and Reference.		Age and Sex.	Time after Injury.	Special Symptoms.	Nature of Intra-peritoneal Injuries.	Treatment.	Result.	Remarks.
Dr. Nevastopoulos, Constantinople, Bulie-Mem de la Soc. de Chir. I. xiii, 1887, p. 273. Operation, 1880.		30	1 hr.	Revolver wound (5 or 5 mm.) in middle of line joining right iliac inferior 2) spine and umbilicus, fecal fluid in wound with blood, pressure caused escape of intestinal gas, paleness, patient cold, anxious.	Oval wound of small intestine with a long loose flap of its wall, wound too long to be sutured.	No anesthetic, no special preparation; surgeon supplied with usual instruments, wound enlarged vertically 15 centimetres with scissors cutting the whole depth of abdominal wall, including peritoneum, one litre of blood escaped with clots from abdomen, the intestines followed solid with faces, resection of a wounded portion of bowel ends invaginated, Lembert's suture, one thread, retaining the coil near the wound.	R	Abdominal cavity washed out with carbolic solution, warm, iodoform dressing of wound.
		60 M	4½ dys	Severe shock, restless, anxious, hiccough, no vomiting shot from 32 calibre revolver had passed from a distance of 6 to 8 feet into the abdomen, at a half an inch below and internal to anterior superior spine (2 side), nothing abnormal on palpation except pain.	Six inch rent in the descending colon, large enough to admit the hand which was passed into the rectum much fecal fluid, but only a trace of faces in the abdomen, intense tympanites.	Expectant treatment to morning of Sept. 9th, when all the symptoms of severe peritonitis were present and patient was very weak then laparotomy median, careful antiseptics, complete examination of intestines, 6 inch rent in descending colon sutured with continuous catgut, 1000 form freely used over intestines, abdomen washed freely with 1 to 1,500 hyd. bichlor., abdomen drained with small tube, operation lasted 55 minutes.	R	Suffered much shock and nearly died from injudicious feeding, but ultimately recovered.
Dr. V. Dean, Rec. St. L. City Hosp. unpublished		16 M	Not given.	Condition very bad at time of operation.	Injury to small intestine.	Laparotomy, suture of intestine, cleansing of abdominal cavity.	Healed.	

H. H. Mudd, not fully re- ported Jour. Amer. Med. Ass. Nov. '87 table p. 579.	17 M	3 days.	Condition at time of opera- tion good.	Injury of liver and stomach.	Laparotomy, suture of stom- ach.	Died.	Stomach wound had entirely closed, extravasation of blood in meso-colon about 4 inches in breadth, slight peritonitis.
N. B. Carson, St. L. Cour. Med. March 1887.	25 M	6 hrs.	Condition at time of operation good.	Wound of small intestine and mesentery.	Laparotomy, suture of wound- ed viscera and resection of 2½ inches of intestine.	Died.	Operation unsatisfactory on account of inability to cleanse peritoneal cavity.
D. Priole not reported, Jour. Amer. Ass'n. Nov. 1887, table p. 579. Opera- tion, June 25, 1886.	35 M	1 hr.	Condition at time of operation good.	Injury of ascending colon.	Laparotomy, suture of wound in bowel.	R	Attempt was made to enter abdomen in median line, but prevented by old adhesions, origin of gunshot wound opened up, patient recently seen in full work.
C. Kollock, Cheraw, S. C., Med. News, April 30, 1887, p. 480. Opera- tion Dec. 19, 1886.	15 M	7 hrs.	Condition of patient at time of operation fair, restless, anx- ious, much thirst, pulse weak, emphysema of external wound. Rectal temperature subnormal, blood passed with a motion before opera- tion, faces escaped from wound.	Perforation of ascending co- lon and of small intestine, bullet entered left groin, emerged 1½ inch to right of umbilicus, appendix epi- ploica was found bleeding and tied.	Laparotomy, median 3 inch- es, suture of wounded in- testines (after pairing of edges) by Lembert's stitches, faces removed from abd. cavity, which was then irrigated with hot carbolized water.	R	Patient a negro lad, operation done under difficulties.
M. Freger, Deut. Med. Woch. July 15, 1886.	19 M	6 hrs.	Patient collapsed at time of operation.	Injury to small intestine.	Abdominal wound enlarged and intestine resected out- side of cavity.	R	
F. Farham N. O. M. & S. Jour. 1886, xiv, p. 508.	34	2 hrs.	Patient suffering from shock.	Injury of small intestine, as- cending colon, and bladder.	Laparotomy, suture of wound- ed viscera.	Died.	
F. Farham, N. O. M. & S. Jour. 1886, xiv, p. 508.	22	3 hrs.	Patient suffering from shock.	Injury to small intestine and external iliac artery.		Died.	

TABLE—CONTINUED.

Operator and Reference.	Age and Sex.	Time after Injury.	Special Symptoms.	Nature of Intra-peritoneal Injuries.	Treatment.	Result.	Remarks.
M. Pickett, M. P. W. N. Y. R. '86, 5, 6, 1, p. 247.	13 M	Not given.	Patient's condition good.	Wound of abdominal wall.	Exploratory laparotomy.	R	
W. Smart, E. M. J. Vol. i, '89, p. 379.	9 M	Not given.	Patient suffered from shock.	Wound of liver.	Laparotomy.	R	Ball extracted from liver.
J. W. Heddens, S. Joseph, Mo. An. of Surg. Dec. 1886, p. 528. Trns. Md. Ass'n, Mo. Operation 1886.	30 M	Not given.	Wound in epigastric region from pistol, complained immediately of great pain in right side, shoulder and back, with dyspnea.	Wound of liver.	Laparotomy from wound downwards for 5½ inches, piece of cloth removed from abdomen, together with four ounces of blood, antiseptic dressing.	R	No bad symptoms.
J. H. Packard, Med. News March 26, '87, p. 339.	33 M	Shortly after, about 1 hour probably.	Marked collapse, temperature 97.5, pulse 120, respiration normal, food and some blood vomited, bullet (calibre .38) entered 2 inches to left of umbilicus and ½ inch below it, no escape of fecal matter discovered, but blood was found in peritoneum.	Eleven wounds of small intestine, one at ileo-caecal junction, all were ragged and varied in size, omentum torn and bleeding at one point, a large vein wounded at upper and right side of pelvis, (tied), found to be the external iliac, near Poupert's ligament.	Antiseptic laparotomy in median line after wound had been enlarged, peritoneal cavity irrigated with 1 to 15,000 hyd. bich. intestines systematically examined, 11 holes sutured by Lembert's method, catgut being used, at one spot about 1 inch of bowel resected with V-shaped portions of mesentery. Lembert's suture, operation very prolonged, probably over 2 hours, drainage tube in peritoneum.	Died after 14 hrs.	Pulse fell alarmingly at one time during operation, but rose at once on irrigating the abdominal cavity with hot water, sank steadily after operation, slight evidence of peritonitis, post-mortem, no other wounds found.
F. Lange, Med. News, Nov. 26, 1887, p. 699, operation Oct. 13.	14 M	24 hrs.	No shock, pulse 112 to 120, no pain, but marked tenderness on pressure to the left, some tympanites and abdominal wall was tense.	No. 22 pistol ball entered 1¼ inch below navel and 1 inch to left, seven perforations of small intestine, three pairs, one single, four ounces of brown fluid found in peritoneum, no faces.	Laparotomy at once in a line with the bullet wound, wounds closed with gut in 6 instances, one was already closed firmly.	R	Bullet not found.

R. T. Manly, N.Y., Med. News, Sept 24, 1887.	? M	2 hrs.	Abdomen greatly distended evidently by fluid.	Double perforation of descend- ing colon, wound of inferior mesenteric artery.	Laparotomy in middle line, exit $\frac{1}{2}$ gal. of blood, bleed- ing was from branch of in- ferior mesenteric artery which was ligatured, per- forations closed by Lem- bert's sutures.	R	Bullet not found, good union did not take place in abdo- minal incision.
C. E. Case, Ta- coma, Med. News, Sept 24, 1887, p. 379.	Young M	.....		Pistol ball 32 calibre entered 2 inches to right of umbilicus, emerged 3 inches to right of spine.	Laparotomy antiseptic, con- siderable quantity of blood in peritoneum, ? wound of bowel.	R	Convalescing at time of re- port, which is very short.
J. M. Fox, Phil., Med. News, Nov. 12, 1887, p. 568.	18 M	3½ hrs.	General condition fair, tem- perature 98.5, pulse 110, slight fullness of abdomen, pain dull in umbilical re- gion.	Bullet wound $\frac{1}{2}$ inch below and $1\frac{1}{2}$ inch to left of um- bilicus, wound of omentum, of transverse colon, of je- junum, mesentery of latter, bullet lodged in back, no facial escape, intussuscep- tion of ilium noticed and re- duced at operation.	Median laparotomy from $2\frac{1}{2}$ in above to 4 inches be- low the umbilicus, consid- erable quantity of blood in abdomen, Lember's su- tures, warm hy. chl. solu- tion used for cleansing, abdomen washed out with warm water, rubber drain tube, operation lasted 1 hour and 10 minutes.	R	Drain tube removed July 5.
W. W. Keen, Med. News, May 14, '87.	F 18	9 hrs.	Condition at time of operation was fair.	Liver, stomach, intestine, su- perior mesenteric vein and kidney.	Laparotomy, suture of wounded viscera, neph- rectomy.	Died.	Surviving 15 days, died of peritonitis due to gangrene of bowel at the site of one of the perforations.
I. Warren, N. Y., Md. Jour. Sept. 17, '87. p. 325.	18 M	24 hrs.	Great shock, temperature 96 F., pulse very rapid, nausea.	5 wounds of small intestine, 2 of mesentery, general peri- tonitis.	Laparotomy, Lember's su- ture of wounds, cavity in 14 washed with a weak solu- tion of carbolic acid.	Died	
A. C. Bernays, Pittsburgh Med. Re- view, April 1888.	11 M	19 hrs.	Abdomen tympanitic, pulse 120, temperature 101, wound of entrance posterior mid- way between ilium and last rib,	Considerable blood in cavity, but no faces, wound of en- trance in small intestine, bullet 22 calibre, bullet lodged in mesentery, piece of clothing found in peri- toneal cavity,	Laparotomy, median line, Lember's suture.	R	

TABLE—CONCLUDED.

<i>Operator and Reference.</i>	<i>Age and Sex.</i>	<i>Time after Injury.</i>	<i>Special Symptoms.</i>	<i>Nature of Injuries.</i>	<i>Treatment.</i>	<i>Result.</i>	<i>Remarks.</i>
A. C. Bernays, Pittsburgh, Med. Rev. April 1888.	F 9	1 hr.	Condition good at time operation.	Blood and faces in peritoneal cavity, wound made by 3 turkey-shot in 32 calibre pistol, 1 hole in abdominal wall in right inguinal region, 3 separate holes, near each other, in ascending colon, shots loose in colon.	Laparotomy, Lambert's suture, incision made at site of wound, removal of extravasated blood and faeces.	Died. In 3 days.	No post-mortem.
H. C. Dalton, present paper	22 M	2 hrs.	Condition at time of operation good, revolver shot, 35 calibre at distance of 4 or 5 feet, no shock, no pain, no vomiting, pulse at time of operation 82, temperature 98.8 F.	Bullet passed through stomach and left lobe of liver, considerable hæmorrhage in cavity.	Median laparotomy. Lambert's suture in stomach, 3 to wound of entrance, and 4 to wound of exit, ironed silk in finest eyeneedle used, wound of liver sutured by large cat gut.	R	Bullet not found.
J. D. Griffith, unpublished	26 M	6 hrs.	Bullet 38 calibre at a distance of 2½ feet, powder burn on clothing, drunk at time, bullet entered half an inch to right and just below umbilicus, considerable shock.	3 coils of small intestines cut, number of large clots in cavity.	Laparotomy, median line, 6 inch opening sewed up by Lambert's sutures, 26 stitches.	Died.	Nothing found on post-mortem, no peritonitis.
J. D. Griffith, unpublished	21 M	8 hrs.	Intense shock, 2 balls entered the left side just anterior to anterior margin of quadratus lumborum muscle.	2 holes in descending colon, 11 inches in length, in pyloric end of stomach, letting out contents of stomach, which consisted of beer, limburger and crackers.	Laparotomy, median incision 11 inches in length, wound of stomach too large to bring together, without bad constriction, made large graft from meso-colon, used 122 Lambert's sutures, operation lasted 4 hours 20 minutes.	Died. In 11½ hours.	Never recovered from shock, post-mortem revealed plastic union, everywhere, nothing in abdominal cavity
Geo. Cupples, Trans. Texas State Med. Ass'n. 1886.	F 21	2 hrs.	Very great hæmorrhage, patient very weak.	4 wounds of intestine.	Laparotomy, median line, 3 inch incision, resection of 3½ inches of ileum, including 4 bullet wounds, Lambert's sutures, 37 in number, silk, time 1 hour and 55 minutes.	Died.	Bulle, passed from right hypochondrium to left hip, through ilium, whence it was removed by incision upon dorsum lili.
O. Halbert, T. of Tx. S. M. Ass'n. 1886.	21 M	.....		Liver wounded, much blood in peritoneal cavity, bowel uninjured.	Laparotomy, median line, 4 inch incision, toilet of peritoneum.	R	Peritonitis on 8th day, meningitis until 11th, violent delirium.

SOME POINTS OF PRACTICAL IMPORTANCE IN THE OPERATIVE TREATMENT OF RODENT ULCER.

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CHILDREN AND WOMEN.

PROPRIETY OF OPERATION.—In this form of malignant disease owing to its extremely slow progress, its very long connection with some well known flat-topped wart, long familiar to the patient and his friends, the operation is sometimes put off until the extent of the ulcer causes some difficulty in urging or advising an operation.

The following may help in forming a decision, The extent, depth, and site of the ulcer. A case of moderate severity, say of the size of a five-shilling piece may always be submitted to operation if the general health and vitality are satisfactory. But the difficulty of deciding will be much greater in cases which involve extensively the orbit and nose, and eye as well, perhaps; especially if the bones on the delicate inner wall are much involved; in the rarer cases in which orbit, nose and mouth are thrown into one hideous chasm¹; and those cases, also rare, in which the ulceration extends very widely, though superficially, over the side of the head and face, involving forehead, temple and parotid region².

¹As in Figs, 2 to 6, at the end of Mr. Moore's work on Rodent Ulcer.

²Mr. Moore (*loc. supra cit*, fig. 9) shows one of these superficial but vast rodent ulcers; and his cases VI and VII show the exceeding difficulty if not impossibility of completely curing them even in hands as experienced as his; he thought (p. 58) that the firmness of the skull presented a mechanical obstacle to the complete healing of these large sores. Mr. Hutchinson (*Clin. Surg.*, Vol. II Pl. 65) points out that this extensive form may be very superficial for a long time, may even cicatrize with tolerable soundness, but that sooner or later a stage of deep growth and rapid progress is almost certain.

In all cases of severity the following should be carefully considered, viz., the real age¹ of the patient *i. e.*, the age, not reckoned by years alone; his habits, how long he probably has before him if no operation is performed; whether the disfigurement seriously interferes with the following of an active life; whether there have been any brain symptoms referable to the growth; the condition of the viscera; any liability to erysipelas; finally, each case being considered by itself, certain conditions will justify operations in otherwise doubtful cases, as when a rodent ulcer having destroyed the sight of one eye, is creeping across the nose and threatening the opposite one.

THE OPERATION ITSELF.—In these days of aseptic surgery the combined operation by knife and caustics or cautery will be preferred to one by the latter alone, on account of its greater precision and more rapid and more painless healing, from the absence of fetid sloughs, and the diminished liability to erysipelas etc. The following hints may be found useful in an extensive operation for rodent ulcer.

(1) Precautions against erysipelas.—To diminish the risks of erysipelas in these patients, the ulcer and the surrounding parts should be carefully cleansed and kept as aseptic as possible by means of such precautions as keeping the surrounding parts shaved and cleansed with lotions of carbolic acid or mercuric-perchloride, removing all scabs, and powdering the surface of the nose with boracic acid and iodoform.

(2) Steps of the operation itself and the application of caustics.—The surgeon first makes a groove-like incision

¹Sir James Paget's words on the risks of operations in old people (Clin. Lect. p. 6) may be quoted here. "They that are fat and bloated pale, with soft textures, flabby, torpid, wheezy, incapable of exercise, looking older than their years, are very bad. They that are fat, florid and plethoric, firm-skinned, and with good muscular power, clear-headed and willing to work like younger men, are not indeed good subjects for operations, yet they are scarcely bad. The old people that are thin and dry and tough, clear-voiced and bright-eyed, with good stomachs and strong wills, muscular and active, are not bad; they bear all but the largest operations very well. But very bad are they who looking somewhat like these are feeble and soft skinned, with little pulses, bad appetites and weak digestive powers so that they cannot in an emergency be well nourished." Sir James goes on to speak of their inability to bear loss of blood, the lazy healing of large wounds, the liability of their stomachs to refuse food, their prolonged convalescence, their getting "all but well" and the need of meeting these special dangers with special cares.

around¹ the whole, or, in a very extensive case, around part of the growth, and well wide of it, and arrests the bleeding by sponge-pressure, and this failing by ligature or by leaving on Spencer Wells' forceps.

The next step, that of removing the affected soft parts, is often difficult owing to their proneness to break away, and to their giving no firm hold to forceps; a sharp spoon is often very useful here, but scraping alone is not to be trusted to. Having scraped away the growth down to tissues apparently healthy, the surgeon scrutinizes these most carefully, picking away every atom of yellow grey granulation-like material, and then again scraping away with careful thoroughness. Where the bones themselves appear eaten into, scraping alone will not be sufficient, and it will be wiser to go over the worm-eaten surface with a fine gouge or chisel². In one region especially these must be used with the utmost caution, *i. e.*, when the paper-like bones on the inner wall of the orbit are involved; in this place if the surgeon is not satisfied with the limited use of the gouge or chisel, which is alone permissible here, he must be content with finally applying Paque-lin's thermo-cautery. unless removal of the eye at the same time has allowed of the use of zinc-chloride paste.

In other places this most valuable caustic may be used fearlessly, as long as the precautions are taken to use it in a concentrated form, and to apply it as firmly and as thinly as possible, so that the discharges from the wound shall not allow it to liquefy and run either towards the eye or nose or throat.

(3) Advisability of preserving the eye in cases where the conjunctiva is involved.—As a rule in these cases consent should be asked to remove the eye, if needful. Cases clearly requiring this step will be those where (1) the eye is already useless or so distinctly deteriorated that it cannot improve, (2) where the lids have shrunk away from it, and left it irritable

¹A pair of blunt-pointed scissors may be found useful when the lids have to be cut through.

²Mr. Moore (*loc. sup. cit.* p. 51) speaks decisively on this point. "The bone itself must be taken away to a depth exceeding that which has yielded to the disease. Recurrence is otherwise inevitable." Mr. Moore seems to have used cutting bone-pliers for this purpose.

and painful from exposure, (3) where the disease cannot otherwise be removed, and where caustics cannot otherwise be made use of.

As a rule if the conjunctiva is much involved, the necessary removal of this will cause sloughing of the cornea. Occasionally this may seem to threaten and then to pass away; this improvement is however fallacious. Thus some months ago a patient of Drs. T. & J. B. Howell at Wandsworth came under my care for extensive rodent ulcer. Both lids of the right eye, the conjunctiva largely, the inner part of the orbit, root and the right side of the nose and upper part of the right cheek were involved. The operation had been advised ten years before, the disease being of much longer duration still. After removal of the soft parts involved by the growth it was found that the lachrymal and ethmoid had been especially involved, being very vascular and worm-eaten. Repeated applications of the sharp spoon and a small gouge were made use of, and finally Paquelin's thermic-cautery was applied. The inner half of the conjunctiva was involved and removed freely, the internal rectus being largely exposed. The cornea became cloudy and discolored for a while, but on the third day the pupil was visible and the patient could distinguish between the medical men at his bedside. The cornea however again became opaque, and perforation took place about three weeks later. The patient now consented to my removing the eyeball, which gave a much-desired opportunity of applying zinc-chloride paste. At this time though the resulting wound was small, and the former elevated hard, sinuous edge replaced by a healing margin, the surface still showed near the inner margin of the orbit a suspiciously glossy, reddish yellow patch. This was again thoroughly scraped, and the zinc-chloride paste applied. As the tough black slough resulting from this separated about three weeks later, a perfectly healthy granulating surface was left, suitable for skin grafting.

It would have certainly been much wiser to have removed the eye at the first operation; the patient, however, had so much difficulty in making up his mind at the last to be operated upon, that it was thought best to make an attempt to do without any additional mutilation.

If the rodent ulcer has in addition to implicating the eye

involved the walls of the orbit as well, the course most likely to give satisfactory results will be to perform "exenteration of the orbit," if the patient's condition admits of it. The operation by the method of Arlt is thus described by Mr. Butlin.¹

"When the patient is thoroughly under the influence of an anæsthetic, the outer commissure is slit as far as or beyond the margin of the orbit. The lids are raised off the tumor or eyeball, the fold of mucous membrane which unites them to the globe is divided as far from the globe as may seem desirable, and they are then turned back upon the cheek and forehead out of the way until the operation is completed. The growths or contents of the orbit are now seized with vulsellum forceps, drawn forwards and separated from the wall of the orbit with the aid of a blunt elevator, commencing at the outer wall. This can be done without difficulty when the tumor is not adherent at the sides. The separation is performed at all sides until the optic nerve and the attachments of the muscles at the back are reached, when they are all divided with a strong pair of slightly curved scissors.

If the periosteum is adherent to the tumor, and it is considered expedient to remove it, it must be incised at the margin of the orbit, where it adheres firmly to the bone, with a sharp scalpel, after which it is raised up from the bone in the same manner as the contents of the orbit were separated, and is removed either in whole or part."

THE AFTER-TREATMENT.—(1) The chief object here is to keep the wound absolutely sweet. I prefer for this gently packing the wound with iodoform gauze, or, in cases where erysipelas may be expected, dusting with iodoform and then a dressing of boracic acid lint soaked in a saturated solution of the acid, and changed at regular intervals. Sufficient morphia should be given for the first day or two, and the bowels kept regularly open. If zinc-chloride paste has been used, attention must be paid, as already advised, that it does not melt and run into parts like the eye, nose and mouth, and for this same purpose, the position of the patient's head must be looked to.

¹Oper. Surg. of Malig. Dis. p. 8.

(2) If it has been found needful to attack vigorously the bones of the skull, or even to apply some of the caustic, to diseased dura mater, and if, during the first ten days after the operation, fits make their appearance, it does not necessarily follow that cerebral inflammation is setting in. According to Mr. Moore¹ the fits may be slight and the unconsciousness of brief duration, or severe and attended with coma, but as a rule they are recovered from.

(3) Secondary hæmorrhage. This is rare after the use of zinc-chloride, which forms a dry black slough, and also seems to me to prevent the risk of pyæmia. But if the cautery only has been used, the amount of fœtor is much greater, and in parts so vascular, secondary hæmorrhage may easily occur, if the wound is foul.

(4) Recurrence. The patient must always be most carefully watched and in the case of extensive and deep disease, any suspicious granulations that appear must be attacked at once.

(5) When after a severe operation, a plastic operation cannot be performed, very much may be done by a well made vulcanite mask, as is shown in Figs. 6 and 7 in Mr. Moore's book.

THE PADDED BOARD STRETCHER IN THE TREATMENT OF HIP DISEASE AND VARIOUS TRAUMATA.

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FOR several years I have used the following contrivance in the treatment of hip disease, and traumata, with the most satisfactory results. As far as I know the device is novel.

¹Loc. supra. cit., p. 54. So too Mr. Lawson, speaking of the removal of malignant tumors of the orbit (Dict. of Surg. vol. ii p. 119) says that he has three times seen epileptic convulsions follow within 36 hours of the operation, but they have in each case ceased after the removal of the zinc-chloride from the orbit.

The apparatus is a light, smooth, rectangular pine board, about a foot longer than the patient, and eight inches broader, and one inch thick. Six inches from one end of this, there should be fastened by screws, and light iron supports (underneath) a light, firm foot piece, which should extend across the longer board, and in breadth should be an inch or two more than the length of the patient's feet. In profile thus :



FIG. 1. PROFILE OF PADDED BOARD STRETCHER.

- a.* Long board.
- b.* Foot piece.
- c.* Iron supports.

The face of the long board should be padded, and quilted, this covering being firmly secured by tacks. The covering material should be rough and retentive, to prevent slipping. Along the sides and ends, hand are holes cut, on the bottom corners, iron teeth are set to keep the board from slipping when placed against the wall, etc. In addition to this, other appendages can be attached; as arm slings and supports, a movable table shelf, perineal, head, and foot pulleys or fastenings or suitable openings may be cut through for purpose of stool, decubital ulcers, etc. The patient is so placed on this apparatus (naturally resection, redressement or fixation if necessary precede this) that the foot of the sound limb rests upon the cross piece. The board then being elevated at the head brings the diseased limb and joint in extension. (Hutchinson.) Further extension and body fixation can be obtained as desired by a leaden soled shoe, by foot, perineal, head and lumbar fastenings or pulleys or apparatus after the methods of Gurdon Buck, Volkmann; Rauchfuss, Koenig, et al. Usually, an inch

block of wood should be placed under the foot of the sound limb.

Now the patient is in that shape that he may have his body placed in any suitable angle by raising and leaning the head of the board against a wall or tree. Folding legs can be hinged on beneath, after the manner of a portable cot, and on this arrangement the patient can be comfortably transported. In point of portability it resembles the Sayre-Bonnet cuirass, with obvious points of advantage, as cheapness, comfort, cleanliness, and in permitting any form of fixation or extension dressing. But in the garden and chamber, it finds its largest scope for use, and comfort. I have used it as a hammock and seesaw, young children could be bandaged papoose style upon it, or adjustable rockers fitted to it, and it is used as a crib, etc. It nicely substitutes Volkmann's lifting frame, and presents little trouble in the process of transfer of the patient, from the bed to it or vice versa. It can be placed in the bed beside the patient and with a little manœuvering they learn to get off, and on it: one patient getting on it in the night when she became restless or wished to void her stools. I have usually begun by keeping the patient on the board for an hour or so at first, and then gradually increased the time, not permitting him to tire by keeping too long in one position. Usually, one attendant can manage the patient without difficulty. The greatest claim for this apparatus, is its excellent fitness for those very worst cases in which nothing seems able to be done, *e. g.* in old chronic bed ridden cases, in which hypostases, indigestion, and amyloid troubles exist. In other tubercular complications, as of viscera or other joints, spondylitis, marasmus, or chronic atrophy, with fatty degeneration of viscera, muscles and ligaments, as a last refuge it will be found to do good work. By changing the circulatory, and pressure planes of the body it inaugurates a system of gymnastics to the viscera—notably the heart—muscles, ligaments, etc. It starts a metabolism, an exercise of function, and that, in so delicate, and harmless a way, that it may be begun when the powers of the sufferer are almost nil, and can be increased almost to normal. In one case the patient was in extremis, marasmatic; so weak was her heart that when she was first

placed on the board (changed on a sheet hammock wise) if the head of it were raised but 20° from the horizon, she would go into syncope. She shortly improved sufficient to stand ætherization, and *redressement forcé*, and walks to-day with the aid of a stick. By this means, hypostatic catarrhs, pain in the knee and hip disappear at once, and the appetite and sleep improve.

I would recommend in very weak patients that the elevations be begun gradually and carefully, and that extension methods be exchanged, using Buck's when the patient is abed. One of the best gymnastics in the earlier stages, is to balance the board on the foot board of the bed and use a gentle see-saw motion, also use massage, passive exercises, riding, etc. Norwegian oil, beer, tokayer, and toddy to be given freely. The writer hazards the following on the various peripatetic apparatuses that are in common use. In all of these, is there not under the most favorable adjustment, a modicum of movement in the diseased joint, and is not this movement (in some cases) productive of local and constitutional irritation sufficient to hinder or delay repair, in a local or general way? Are not these apparatuses when properly understood, of a very much more limited field of application than is given to them? Are they harmless? Who but a master in their use can prevent progressive adduction and contraction? And do they really? Are they adapted to hospital or pauper practice? Are coxitic patients' nutritive powers usually sufficient to carry on repair and body exercise, and possibly withstand injurious irritation? Naturally, they are reciprocal up to a certain extent, but suppose that standard is exceeded or mistaken, will not harm follow? Are ambulatory contrivances of the value that the profession has heretofore conventionally (perhaps perfunctorily) ascribed to them? The endeavour has been to fulfill certain indications that are not entirely secured by the usual means, such as easy adaptability, practicability, comfort, safety,—but above all things else, that cheapness and simplicity, that will give it to the afflicted poor.

CASE OF SARCOMA OF THE SCALP.¹

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P RIMARY SARCOMA of the scalp is of such infrequent occurrence that I trust that I may be pardoned for reporting a case recently under my care.

In the latter part of October, 1885, I was consulted by Mrs. S. æt. 25, white, resident of eastern Kentucky, who stated that fifteen years before she discovered on the back part of her head a small hard lump "of size of a bean," not painful on pressure. For thirteen years there was no noticeable change in the tumor; but at the end of that time it began to enlarge, and continued to do so steadily until the time of her confinement (five months before I saw her) when the mass was "as large as a goose egg." Since delivery its growth had been very rapid and attended with pain, at times severe. The woman was much emaciated and greatly enfeebled. The tumor, occupying the occipital region and looking much like a second head, was somewhat movable from side to side, and upon palpation pseudo-fluctuation was detected. It measured antero-posteriorly seventeen inches, laterally fifteen inches; its greatest circumference was twenty-one inches and its least circumference at the line of junction with the head, was fifteen inches. The tumor was removed on the 23rd of October, two narrow lateral flaps and a posterior one being made and the mass readily and quickly separated with the fingers from the pericranium to which it was nowhere adherent. Hæmorrhage, which was quite profuse, though from no large vessels, was easily arrested by the application of hot water. The flaps when brought together covered in the entire bared surface. Small drainage tubes were brought out at the ends of the base of the now inverted T shaped wound, iodoform dusted on and a thick layer of absorbent cotton applied. The mass removed weighed almost five pounds, and upon examination proved to be a spindle celled sarcoma.

¹Read before the Surgical Section of the Amer. Med. Ass'n., May 10, 1888.

The drainage tubes were removed on the fourth day, and the sutures (silk) on the eighth, when union was found to have taken place. The woman left for her home on the fourteenth day.

For eighteen months (until May 1887) she continued well, but at the end of that time noticed a small tender spot and soon after a hard lump, which increased slowly for three months and then more rapidly. She was about a month advanced in pregnancy when the recurrence was observed. After her confinement (in the middle of January of this year) excessively rapid growth took place, and when I saw her on the



FIG. 1. PROF. CONNER'S CASE OF SARCOMA OF THE SCALP.

first of March, the mass measured antero-posteriorly eighteen inches—laterally seventeen and one half inches, with a greatest circumference of twenty-five inches. Its surface was of a bluish color and several large veins ramified upon it. On the third of March I removed it, making no effort to save any covering, but cutting along the line of junction with the head. The pericranium was in places included in the diseased mass, and was taken away. After the bleeding (less profuse than at the time of the first operation) had been checked, the edges of the wound and the denuded surface were cauterized with the

Paquelin button. The mass after removal weighed seven and one-half pounds, and examination showed that it was a mixed spindle-and round-celled sarcoma. Dry borated dressings were applied. At the end of the second week erysipelas of the left side of the face, extending up on to the scalp developed itself but ran a mild course. Five weeks after the operation the patient left for her home, the granulating wound being in excellent condition.

The points of special interest in this case are the years-long absence of any change in the original nodule, the marked influence of pregnancy and lactation upon the growth of the tumor both primarily and in recurrence, and lastly the immense size of the growth. The scalp is not seldom involved in sarcomata affecting the skull, but a primary tumor of such character located in it is exceedingly rare. As when situated elsewhere, in spite of removal and re-removal, the disease may be expected to recur and ultimately destroy life; but operative interference may result favorably, especially if timely. No hard, indolent lump in the scalp should be permitted to remain, even though for years in an unchanging and unchanged condition. Probably benign and to continue such, it may not be so now or in the future.

EDITORIAL ARTICLES.

ON THE DYSTROPHIES OBSERVED AFTER RESECTIONS—A CONTRIBUTION TO THE STUDY OF THE RESULTS GIVEN BY THESE OPERATIONS¹

As Prosector to the Faculty of Medicine at Lyons, M. Rochet works under the direction of M. Ollier, and in fact his paper, the title of which we quote, is based upon a study of sixty of Ollier's cases of resection.

The best way to get a just idea of the value of a particular mode of treatment is to study the distant results of it.

This study is not altogether simple. One may approach it from various different points of view. There is the degree of usefulness remaining in the limb or organ operated on. There is the effect on the progress of the original disease; and again there is the ultimate effect of the operation on the general state of the patient. Take for example a joint after resection. What is the condition of the articulation or rather of its former site when examined many months afterwards? How much solidity or what degree of movement? How are the affected bones as regards length and thickness? What is the patient's general condition? Has the progress of the local disease been checked? What is the state of the surrounding soft parts, and what that of the general nutrition of the limb? Are there nutritive alterations in the skin, muscles, nerves, and what is their nature?

The study of these distant results of excisions has been made already by G. Wolff, Gurlt, Lossen, Baraban, and above all, by M. Ollier in his masterly "Treatise on Resections."

¹Des dystrophies observées à la suite des résections (Contribution à l'étude des résultats généraux fournis par ces opérations). Par V. ROCHET, Prosecteur à la Faculté de médecine de Lyon. *Revue de Chirurgie*, No. 10, Octobre, 1887.

But there is one particular point of this investigation which has been, if not unnoticed, at least very incompletely examined by those authors, although M. Ollier has indicated its importance and called attention to its principal characteristics, namely, the trophic disturbances observed in the subjects of resections. Under this head are classed alterations of nutrition affecting various organic structures, skin, muscles, nerves and skeleton, and also the appendages of the skin, *e. g.* hairs and nails. They are characterized by important changes in the appearance and function of these parts. Some of these effects are of comparative unimportance, because they influence merely appearance. But others, associated as they are with great or even total incapacity, severe pain, etc., are of the greatest moment.

M. Rochet, while acknowledging that J. Wolff studied these changes very ably, thinks he was too concise in his treatment of them. M. Rochet is careful not to lay himself open to that charge. Wolff regarded only the changes in the skin and its belongings. He paid no attention to the osseous, nervous and muscular lesions. He established no distinctions between the changes observed after pathological resections and those seen after traumatic ones ; but the difference is immense between the suites of these two classes. Moreover Wolff made a very serious mistake in greatly exaggerating the evil nature of the prognosis to be derived from the phenomena he described, and in stating that resection would only make matters worse. The truth is that resection made under suitable conditions lessen the trophical disturbances.

Gurlt put down to the account of resection's every thing which followed them, and, nevertheless, it is not the operation which is responsible for the dystrophies ; they pre-exist before the resection, are met with as sequences of other modes of treatment or in the course of chronic osseous and articular affections, and have no special relation to resection.

We can partly confirm the truth of M. Rochet's statement, but have nevertheless seen grave trophic alterations which were almost certainly the result of resections and not of the diseases for which they were done. Is not M. Rochet in his indignation at Gurlt's statements going rather to the other extreme ?

The worst of the trophic changes described by Gurlt are special to traumatic resections, made, as is well known, under particularly unfavorable conditions. Such are never observed after properly executed pathological resections.

Loosen and Baraban made only a summary investigation of the influence exercised by resection on the general nutrition of the limbs. Delorme was still more brief.

Only in M. Ollier's book is to be found a methodical, and, in some points complete exposition of the subject.

The investigations of M. Rochet have been prosecuted under the direction of and with the counsel of M. Ollier, and the chief features of the work were indicated in an inaugural thesis, published at Lyons in 1885. Besides the sixty cases of resection studied, there have also been examined a large number of persons affected with joint and bone troubles and treated by other methods than resection, such as immobilization and bandages, arthrotomy, amputation.

After describing what he found the author compares his observations with those of Gurlt and comes to the conclusion above indicated with regard to the latter. Afterwards he shows that, in general, resection has nothing to do with the production of the troubles described. Finally are given a study of the evolution of the different nutritive alterations in the different classes and cases, as well as short remarks on treatment.

I. Review of the tropical disturbances of various kinds observed by M. Rochet after resections.

The nutritive alterations affecting the cutaneous envelope show themselves by preference in the feet and hands, and are manifested by various signs. In certain cases there is a furfuraceous exfoliation consecutive to true desquamation of the epidermis. M. Rochet has never seen this kind of epidermic dust replaced by a desquamation in large flakes analogous to that which follows scarlatina. There is, however, a girl with ankylosis of the knee and old dislocation of the hip in whom the epidermic flakes are very large, especially on the foot, where some of them measure an inch or more. She is at present under the joint care of myself and Mr. Henry Baker, and the trophic alterations have supervened on the joint lesions.

More commonly there is present the condition known as "glossy skin," or an approach to it. The cutaneous pores and wrinkles have disappeared.

The coloration of the skin may be livid. It is oftener dark red or violet red.

Next, as to the nails, hairs, sweat and subcutaneous cellular tissue. The nails grow faster; they become dry, and their aspect is dull; their surface loses its normal polish; they become thicker and more convex in every direction. Sometimes appear very marked transverse grooves. These changes, observed by Wolff, have been noted also by Rochet.

The *hairs* are generally developed on the affected limb to a degree which at once strikes the eye. In a few cases the converse has been observed. Usually, also, the pigmentation of the hairs is deepened. Gurlt has twice seen the hairs more blonde. The consistence of the hair is generally increased. The area affected by these alterations varies between that over and around the joint and that of the whole limb. But always the new formation affects the aspect of the limb normally most hirsute, namely the side of extension. The scattered hairs occasionally developed abnormally around fistulæ and incisions are usually long and delicate.

In investigating the state of the sweat secretion, two methods may be followed: first, the unsatisfactory one of interrogating the patient; secondly, the much more exact "*methode des empreintes*" of M. Aubert.¹ The latter registers even minute variations.

The sweat may be modified in either quantity or quality. In the great majority of cases, Wolff, Gurlt and Rochet have all noticed exaggeration of the sudoral function. Like the growth of hairs, it may be limited or may affect the entire limb. Often it is limited to, or at least most marked in the feet and hands. In the case of the upper extremity, it may be confined to the axilla.

Diminution of the sweat is noticed sometimes, but rarely.

The changes in the quality of the secretion are indisputable. Weir Mitchell had already noticed this particular in the sequelæ of nerve-traumatisms accompanied by disordered perspiration. The sweat be-

¹*Annales de Dermatologie*, 1877-78.

comes cold and viscid. It is acid, 'sour,' as the patients say, and richer in odoriferous principles.

To complete the trophical disturbances of the cutaneous system, one should add the nutritive alterations in the subcutaneous cellular tissue. They consist of the accumulation of an abnormal quantity of subcutaneous fat. It is the lesion studied by Landouzy¹ in connection with deuteropathic muscular atrophies, under the name of "adipose." This is frequently met with in the subjects of resections. It must not be confounded with œdema, and does not pit on pressure.

Adipose in the subjects of resection is extremely variable, both in extent and thickness. It is far from existing constantly, and is not nearly as frequent as the changes already noted. In Ollier's 60 cases studied by Rochet, it occurred only five times. When the function of the limb is restored, adipose tends to disappear. It is not easy to distinguish between adipose and normal fatness beneath the skin in childhood. It is especially in scrofulous subjects and above all in females that adipose is found. The condition is almost always localized to a segment of the limb. After resection of the shoulder it is ordinarily the arm which is affected. After excision of the elbow, it is also the arm usually where the condition of adipose appears. It rarely seems to follow excision of the wrist. After excision of the hip, the thigh and especially the upper part of it is affected. As a sequence of excision of the knee the whole limb is sometimes affected at first, but only the lower part of the thigh afterwards. After resection of the ankle it is, in the vast majority of cases, confined to the leg.

M. Rochet next deals with that important trophic change, *muscular atrophy*.

This is constant in limbs the seat of resection. But it varies greatly in degree. Often, while well marked immediately after operation, it steadily retrogresses afterward. But the atrophy is liable to increase from time to time under intercurrent influences. ("*Atrophie intermittente*"—Ollier.) Usually the whole limb is affected, but those parts worst which are nearest the resected joint.

A direct relation has been asserted between muscular atrophy and

¹ *Revue Mensuelle*, 1878.

adipose ; but the idea is mainly based on the *a priori* theories which have been upset by the observations of Landouzy. Also, as a matter of fact, there is no constant relation between the two. Extreme atrophy may exist without any adipose. Still, the possible co-existence, or rather, the frequent co-existence of the two diminishes the value of conclusions as to the strength of a resected limb, drawn from mere measurements, as adipose may veil atrophy. As M. Ollier says, the best way to measure the degree of atrophy is to infer it from the degree of muscular *force* found to be lost. M. Ollier goes so far as to write that a patient with resected elbow may preserve all his normal strength with an arm obviously much wasted, and explains this by the theory that the wasting in such a case is in the sub-aponeurotic and interstitial fat, and not in the muscular fibres.

Interesting *thermic* modifications take place. They seem to be extremely frequent and also extremely variable both in different persons and in the same individual. Sometimes they are easily appreciable by the naked hand, but it is much better to use the thermometer, by which alone can precise results be obtained. Certain precautions must be taken. Both sides should be exposed to the air at the same moment. Two exactly corresponding thermometers should be used to the two sides simultaneously. Both Gurlt and Wolff have very properly insisted on the distinction being carefully made between subjective and objective coldness. A patient may feel cold in the limb without its being so, and vice versa. A certain degree of coldness is almost universal in the resected limb ; but it is rarely marked in amount, usually varying between 4 and 8-tenths of a degree. The amount of cold varies greatly in the same individual, being for example much more marked in winter than in summer. In exceptional cases the temperature is raised on the side of resection. Gurlt and Ollier have also noticed hyperthermia on the side of resection.

Having thus reviewed the various kinds of trophic alterations which may follow resection, the author proceeds to classify them broadly into those which may be termed benign and those which are more serious. In the *former* class are the changes in the skin, hair and nails and subcutaneous fat, also in the sudorific function. In the *latter*

are the affections of muscles, of the temperature, and of the great nerves and vessels. It is true that Rochet has met with no serious affections of the great nerves and vessels in his researches, but Gurlt, who deals with military resections, describes them on every page. Ollier, writing of these, says "We have already pointed out as the cause of floating limbs, defective operative technique, *i. e.* the removal of the capsulo-ligamentous apparatus of the original joint; the absence of regular post-operative treatment; the too great height of the portions of bone removed in conditions where regeneration is impossible. These are the three principal causes, but there are others which assist, viz: Muscular atrophy and the trophical troubles which follow lesions of nerves and vessels."

The statements of Gurlt are so surprising when the severity of the trophic changes observed by him is compared with that of the cases examined by Rochet that the latter asks if the former employed modes of estimating it sufficiently exact.

To take first Gurlt's observations respecting the temperature of the limb.

For the shoulder, in more than 100 cases, the temperature was found lowered in 41, the amount being 1,293 and even 6 and 8 degrees. After resection of the elbow, still greater differences were noted—in two cases as much as 10 degrees. All the cases were furnished by the Franco-German war.

Strange as are these greatly lowered temperatures the extent of the "hyperthermias" recorded by Gurlt is more astonishing. They include cases in which the temperature was raised on the side of resection as much as 8 or 10 degrees. Rochet says that there are only two ways of explaining Gurlt's observations. Either they are not made with precise appliances, or the cases must have been the subject of grave accidental injuries, especially wounds of nerve trunks caused either by the original accident or by the surgeon. In fact Gurlt records some instances of injury to the radial and ulnar nerves during operation. Nevertheless Rochet doubts the precision of Gurlt's methods of comparing the temperatures.

More surprising still are the vascular modifications observed by

Gurlt. After resection of the shoulder the pulse was often found weakened and sometimes even retarded. In one case it beat only from 4 to 8 times a minute. No explanation is offered of this last mentioned phenomenon.

That the pulse should be weakened in certain cases is not surprising. When a resection is so done that at the site of the joint removed the continuity of the limb is only maintained by the skin and the vessels and nerve-trunks, grave vascular disturbance is just what might be expected. As Ollier has pointed out, the vascular and nervous stretching causes œdema and general impediment to the circulation. The original traumatism may also have necessitated the ligation of a main vessel.

It must be remembered that Gurlt does not pretend to have observed all the facts and phenomena he gives himself, on the contrary, they are collected from the reports of various surgeons.

Finally M. Rochet asks what is proved by all these grave results, and in reply, says they all demonstrate the importance of distinguishing between resections done for disease and those done for accident, at least as regards their ultimate prognosis.

But M. Ollier hopes that when the operative and post-operative methods advocated by himself are generally adopted, even résections done for injury will show much better results. In proof of this he cites six resections of the elbow done by himself during the Franco-German war, and compares their results with those described by the German surgeons, the comparison being very much to the disadvantage of the latter.

In drawing conclusions from the statements and arguments of M. Rochet's extremely able and interesting paper, of which the above is only an imperfect abstract, it must not be forgotten that there are other grave trophic changes, besides those quoted from Gurlt for the purpose mainly of being explained away or at least shown to have no business to have happened. For instance, there is the irresistible tendency to assume a position of abduction and to lose effective power of adduction after excision of the hip, and its objectionable consequence, a practical shortening of the limb far in excess of that given by

the surgeon who merely measures the two limbs and tries to persuade himself and his pupils of the beauty of the result.

And again, there is the steady increase of the relative shortening after anything like free excision of the knee in childhood. These are trophic changes which M. Rochet ignores

C. B. KEETLEY.

INDEX OF SURGICAL PROGRESS.

GENERAL SURGERY.

I. On the Lime-Treatment (Kolischer) of Localized Tuberculosis. By Dr. E. CULLER. (Tuebingen). Kolischer's method of treatment by the injection of acid phosphate of calcium with an excess of phosphoric acid into tuberculous masses, or the introduction into fistulous ducts of gauze saturated with such a solution, has been given to the profession but lately. Congestive abscesses are only incised, but not scooped out and loosely tamponed with similar gauze. A strong local reaction, much pain and a rise of temperature are the immediate result; then follows a stage of contraction and consolidation of the tissues and the joint is said to re-assume its normal shape. The lime acts in a manner analogous to calcification in spontaneous healing of lung-tubercle. In cases in which caseous degeneration has already been established, the healing process is somewhat different. Here the parenchymatous injections lead to a bursting of the parts and an evacuation from the tissues of the tubercular matter. Kolischer has treated 500 cases by his method, and the results have apparently been excellent.

This induced the author to make experiments with the method at Tuebingen. The results were the following: In a few cases the conditions were undoubtedly ameliorated, but by far the greater part not only showed no sign of improvement, but on the contrary, a rapid increase and spread of the tuberculous infection was observed under this treatment. Whether the phosphate-mixture or phosphoric acid alone was injected, was immaterial; the results were the same. The article finishes with a résumé of the seventeen cases subjected to this treatment, in which the results are really not very encouraging.—*Beitrage zur klinischen Chirurgie. Mittheilungen aus der Chirurg. Klinik zu Tuebingen*, Bd. iii. Hft. 2.

FRED KAMMERER (New York).

NERVOUS AND VASCULAR SYSTEMS.

I. **Clinical Contribution to the Surgery of Nerves.** By Dr. J. ALBRECHT (Zurich). 1. *Nerve Suture*, The author gives the details of one case of primary and two cases of secondary suture of the radial by Krönlein. In the case of primary suture it is not possible to give the exact data as to the recovery of function of the injured nerve (Radialis). On the twelfth day there could be performed an elevation of the carpus, on the fourteenth day an extension of the phalanges (Interossei muscles). The tactile sensibility was the same as at the time of the operation. He lays stress on mistaking the action of the interossei for that of other muscles, and the sensibility of the finger tips as a sign of return of function of radial. Observation proves that the first signs of electric irritability appear in the course of the third or fourth week. In the majority of cases the return of function of the sutured nerve is placed in the tenth or twelfth week. Krönlein in his first case observed a partial restoration of function only after eight months. In all cases authors agree that the process of recovery once initiated continued over a long period. Whether primary or secondary it required months or years for complete restitution of function, while in some cases of primary suture the symptoms of recovery are early in onset, in others they are delayed as long as in secondary cases. There are no positive conclusions to be drawn as to the relation of the time elapsing before operation (secondary) and the time for complete recovery. It has been found that in all cases of successful primary nerve suture, apparent atrophy of muscles and their loss of reaction to the electric current sets in. These persist for a time, and in time recover. The electric reaction sets in through indirect channels. It is only after the lapse of time that the newly formed nerve fibre reaches the muscle—electric irritability. The experimental or clinical primary union of a nerve with restitution of functions in a short time has not yet been attained. This failure of immediate restitution is due to the rapid degeneration of the fibres of the peripheral end of the nerve. A restitution with capacity of transmission and function occurs through the process of regeneration. Regeneration demands two or three months. The complete restitution of function may as above last years, the exact im-

mediate coaptation by suture and slight muscular atrophy are favorable elements to speedy restitution. The time for regeneration in these cases is however approximately the same.

2. *A Case of Traumatism of the Lateral Half of the Cord.*—A stiletto wound in the back on the left of the spine of the third dorsal vertebra occurred in a robust male, æt. 22. Among the symptoms were complete paralysis of the left lower extremity (motor); muscle sensation normal. Hyperesthesia of the skin not present. The tendon reflex of the left side somewhat increased. There is a broad anæsthetic zone on the left side of the trunk, as high as the tenth rib, about 3 cm. above the umbilicus. The upper limit is formed by a line on the fifth rib. On the left side there is anæsthesia of the right lower extremity, also analgesia and loss of sensation of temperature. The anæsthesia reaches as high as the fifth rib. Reflex normal: no vasomotor disturbance. Four years subsequently a slight motor paralysis of left lower extremity remained, with increased tendon reflex, intact sensibility of the left side and the tactile sensibility same as after accident. The above analgesia and loss of sensation for temperature changes have changed but little since accident. Lesion is perhaps in the posterior lateral column of the cord as high as the entrance of the roots of the fifth intercostal N. The author is inclined to accept a partial regeneration of fibres of the cord.

3. *Neurectomy.*—The author records one case of resection of motor and ten cases of resection of sensory nerves. Of the latter cases 7 were males, 3 females. All were operated on for neuralgias seated in the trigeminus supraorbitalis, 1; infraorbitalis, 4; mandibularis, 4; lingualis 1; buccinatorium, 1. These 11 neuralgias required 15 operations. A favorable result was obtained in all cases, but of varying duration. Two patients up to date are permanently cured. The remainder were attacked with a return of the painful malady at periods varying from six months to three years.—*Deutsche Zeitschr. f. Chirurgie*, bd xxvi, heft 5 and 6,

HENRY KOPLIK (New York).

II. Cases of Nerve Surgery. By M. H. RICHARDSON, M.D. (Boston.) These cases comprise operations of nerve stretching, nerve section and nerve suture.

Nerve Stretching.—Case 1 was a woman suffering severe neuralgic pain of the right side. An incision five or six inches long was made parallel to and an inch below the lower border of the ribs on the left side, all the nerves in the incision being either divided or stretched. The operation was not a success. Case 2 was a male subject of sciatica, whose sciatic nerve was exposed and stretched but without benefit. Case 3 was a man suffering from sciatic neuralgia of traumatic origin. The nerve was stretched by forced extension of the limb, with slight benefit.

Nerve Section for Neuralgia.—Case 1 was a recurrence of the third case reported in the ANNALS OF SURGERY, vol. iv., page 518. Neither inferior dental canal or nerve could be found, but from the mental foramen the nerve was found emerging enormously enlarged; its branches were collected together and pulled out of the canal and also from the tissues to which it was distributed, the foramen was chiseled out and the nerve destroyed a considerable distance. A good result was obtained. Case 2 was a case of involvement of a branch of the supra-orbital nerve in scar tissue causing neuralgia. The pain was relieved by excision of the scar.

Nerve Section for Spasmodic Wry Neck.—This was a woman, æt. 48, in whom a torticollis was benefited by section of the spinal accessory nerve of the affected side.

Nerve Section and Suture.—Case 1 was a sarcoma involving the ulnar nerve in a man, æt. 32. The tumor was exsected and the two ends of the nerve sutured. The wound healed well, but the function of the nerve was not preserved. Case 2 was a traumatic division of the ulnar nerve in a brakeman, æt. 22. Sutures were applied, and when the wound healed the man was able to resume his work.

Operations to Relieve Pain from Pressure.—Case 1 was a woman, æt. 23, complaining of pain along musculo-cutaneous nerve. After failure in a superficial operation, a deep incision was made, and between the extensor communis digitorum and peroneus longus a tumor

was found compressing the nerve against the fibula. Removal caused relief, but recurrence has occurred. Case 2 was a woman, æt. 23, who was unable to flex her elbow without exquisite pain. A small bony growth was found at the elbow joint just outside of the biceps tendon, and incision revealed that the external cutaneous nerve was compressed between the tendon and growth. Removal of the latter relieved her pain.—*Bost. Med. and Surg. Jour.*, Feb. 9, 1888.

JAMES E. PILCHER (U.S. Army.)

III. Hemorrhage from the larger Blood vessels in Abscesses. By DR. PAUL GUETERBOCK (Berlin). The theme has been treated exhaustively by other writers under the heading of "Arrosion" of the blood vessels (Boegehold) yet there is a form of hemorrhage which, according to the author, cannot be placed under the above process. This hemorrhage takes place in abscesses and from large vessels. It does not result from an ulcerative or inflammatory erosion of the wall of the blood-vessel. In the process intended to be described by Gueterbock there is a gradual thinning of the walls of the vessel exposed in the abscess. This process extends from the adventitia internally involving all the coats of the vessel. The exact nature of this process the author does not determine. He points, however, to the absence of ulceration-thickening or erosion processes. The vessel having thinned at one point more than another (generally the deepest situation in the abscess) it only needs a slight trauma to cause hemorrhage. These hemorrhages are generally fatal. The author records two cases of the above process. In one case the patient was saved; the antiseptic tamponade was employed.—*Deutsche Zeitsch f. Chir.* bd. xxiv. hft. 5 and 6.

HENRY KOPLIK, (New York.)

IV. Bilateral Suppurative Otitis as a Consequence of Posterior Nasal Tamponade for Epistaxis. By DR. GELLE. The author attacks the general opinion that when death follows a posterior nasal tamponade it is the consequence of cerebral apoplexy, pointing to the fact that consecutive acute inflammation of the middle ear may be the cause of the fatal issue. He reports the case

of a man aged 55, in whom the posterior nares was plugged on account of severe epistaxis, the plug being left in for 48 hours. Three days after its removal acute bilateral otitis media developed, with perforation of the membrana tympani. The patient recovered. He attributes the inflammation to irritation caused by the putrid fluid which results from the plugging.—*Birm. Med. Rev.*, Nov. 1887 after *Revue Mens. de Laryngol.*

V. The Question of Treatment in Wounds of the Femoral Artery and Vein Simultaneously. By MR. W. J. WALSHAM. (London). R. H. W., a medical student, received a punctured wound of the left femoral artery and vein. The profuse hemorrhage that resulted was controlled by digital pressure and a firm bandage. On the following afternoon an arterio-venous aneurism was detected. Three days after, as the tumor was increasing, it was explored. The femoral artery and vein in Hunter's canal were found wounded, and were tied above and below at the injured spot. Uninterrupted recovery. The question of the treatment of a wounded femoral artery was discussed under the following heads: 1. Immediate simultaneous ligature of the femoral artery and vein. The author gave twelve cases in which immediate ligature was applied. In four, and probably in five, gangrene occurred. It was submitted however, that especially as regarded ligature of the superficial femoral vessels, the danger of gangrene had been overrated. 2. Continuous pressure without operation. Out of thirty six cases so treated, thirty-five resulted in arterio-venous aneurism. The dangers of treating this affection were commented on. The author concluded that pressure alone could not be recommended, and showed that pressure itself involved the danger of sloughing and secondary hemorrhage. 3. Temporary pressure in order to allow the collateral circulation to be established before resorting to ligature. The danger of gangrene after ligature was reduced to a minimum when the collateral circulation had become established. Grillo of Naples tied both vessels in fifteen cases for aneurism without a single bad result. In twenty cases collected by the author, gangrene occurred in five only, and in four of these five,

the gangrene was due to other causes. 4. Ligature of the artery and application of pressure to the vein. Cases at St. Bartholomew's hospital were mentioned in which the vein was pricked in tying the artery. No harm followed where the ligature withdrawn and the artery tied higher up. But where the artery was tied at the same spot, thrombosis and blood poisoning ensued. In all the hemorrhage from the vein ceased on tying the artery or on applying pressure to the vein. The author considered that in a wound of the artery and vein there was some risk in tying the artery above and below and leaving the vein untouched, or in trusting to pressure upon it, and that such treatment should only be undertaken when the wound in the vein was very small, and there was a reasonable prospect of the external wound healing by the first intention. 5. The question of the lateral versus the circular ligature of veins in four cases of wounds of large veins observed by the author, its use was successful as it was also in thirteen cases out of sixteen collected from other sources. The fatal cases occurred before the days of antiseptic surgery. The following conclusions were drawn :

1. That when the femoral artery and vein were involved in a punctured wound of the thigh, the safest course was to apply pressure for a few days in the way described in the above case, in order to allow the collateral circulation to become established, and then to cut down and tie the proximal and distal ends of both artery and vein.

2. That immediate ligature, that is before the collateral channels have had time to enlarge, of both the femoral artery and vein, and especially of the common femoral vessels, was liable to be attended with gangrene, although this risk was probably less than had generally been assumed.

3. That ligature of both vessels when in consequence of pressure, as of a tumor, the collateral circulation had become established was attended with much less risk of gangrene.

4. That when the femoral artery and vein were wounded, ligature of the artery and pressure of the vein, if the wound of the latter were a mere puncture, was a safe treatment, provided that the nature of the injury allowed reasonable prospects of the external wound being kept aseptic and uniting by the first intention.

5. That when the wound in the vein was too large to admit of treatment by pressure, the walls might be safely nipped up and a ligature thrown around them without obliterating the calibre of the vessel. But that this procedure should only be resorted to, as in the former case when there was a reasonable prospect of the wound healing by the first intention.

6. That considering the grave risks of gangrene that attend the sudden obliteration of the common femoral vein, the lateral should in this situation, be used for all small and moderate sized wounds that require immediate ligature.

In the discussion which followed, MR. HULKE said it was often difficult to diagnose whether the vein was injured as well as the artery. He had twice, in cases of cancer, been obliged to ligature both the iliac vessels at the same time and the ligature had been followed by no bad results such as gangrene. He thought the risk of gangrene was perhaps diminished by ligature of both vessels. Every case of arterio-venous aneurism could not be treated in the same way. Much must depend on the nature of the case. A man came to him for slight eczema of the foot who for years had been treated with elastic bandage for an aneurismal varix, and had been able to follow his occupation as a carpenter. The patient complained only of the eczema and did not mention the varix which Mr. Hulke only accidentally discovered. He thought varix sometimes followed bruises of vessels when there could be no hemorrhage at the time of the accident. MR. CRIPPS thought that pressure ought always to be tried first, and that many cases recovered under pressure treatment which were not recorded. MR. THOMAS SMITH related the case of a boy treated by pressure who had recovered. MR. PEARCE GOULD mentioned a case of Mr. Lawson's in which the artery was tied but the vein left alone. Complete recovery followed. Pressure was probably as dangerous as ligature. He preferred immediate operation. MR. WALSHAM, in reply, said pressure for a few days was not likely to do any harm, and gave the patient the chance of recovering without operation.—*Royal Medical and Chirurgical Society*. March 27, 1888.

C. B. KEETLEY (London).

HEAD AND NECK.

I. The Occurrence of Coma in Sudden Spontaneous Brain Lesions. By WM. BROWNING, M. D. (Brooklyn). The author concludes a valuable paper as follows: 1. In adults free from relevant complications, embolism involving directly only the extra-ganglionic portions of the cerebrum does not cause coma. 2. Conversely, where the diagnosis of cerebral embolism is warranted, primary coma indicates implication of the basal ganglia or brain-stem. 3. The absence of coma does not preclude involvement of the said lower structures. 4. From the fact that more limited embolic injury involving other portions of the brain is frequently attended by coma, it follows that the location (or seat) of a cerebral lesion is one of the most important factors in the causation of this symptom. 5. Wernicke's view that the slightest disturbance of consciousness by hæmorrhage into this region—as compared with hæmorrhage into other portions of the brain—is owing to circulatory peculiarities, and hence to the absence of the factor of suddenness, is disproven. 6. Of course, thrombosis also, *under like conditions*, would not cause coma. 7. Whether embolism of the Sylvian trunk will or will not cause coma, is a useless question. It depends on the structures supplied by that artery in any given case. 8. It must not be considered that the above conclusions at all disprove the accepted view that the cerebral cortex is the seat of higher consciousness. From the basis thus gained, it will be possible to take up more intelligently the subject of hæmorrhage into the same and even other regions of the brain.—*Med. ical News*, Feb. 18, 1888.

JAMES E. PILCHER (U. S. Army).

II. On Tumors of the Branchial Cleft. By Dr. C. HENRI RICHARD (Tuebingen). These tumors are not as rare as is generally imagined. Nine cases have come under the observation of Bruns at Tuebingen during the past three or four years. They include five cysts, two abscesses and three cancers. Roser was the first to express the opinion that certain cysts in the neck are merely branchial ducts that have become obliterated at both ends. Zahn, in 1885, was able to col-

lect but thirteen cases of the tumor in question, of which careful anatomical investigations are recorded. It appears that during the second week of intra-uterine life the branchial clefts and arches are formed at the sides of the occiput. As the development of the fœtus proceeds the arches coalesce in the median line and the clefts, with the exception of the first, close again. The latter forms the external ear, the tympanic cavity and the Eustachian tube. Now it is evident that imperfect closure of these clefts by coalition of the arches can give rise to the formation of cysts in the neck, situated either superficially or in the deep soft parts. As these arches are covered on their inner aspect with entodermic cells, which later on develop into columnar or ciliary epithelia, and on the outside with ectodermic cells, developing into tessellated epithelia, it moreover also follows that these cysts may be lined with different kinds of epithelium. Of the five cysts which the author describes, four were in males and one in a female. Only in one instance did the cyst develop after a blow in the neck. Their growth was at the outset slow, in a few instances more rapid later on. A slight burning sensation in the throat, and some difficulty in deglutition were noted in a few cases as the only inconvenience to the bearer. Four cyst were unilocular, contained atheromatous matter, and were lined with tessellated epithelia in several layers. The other case in a child of 7 months, was a multilocular tumor, the walls of which were lined with columnar and ciliated epithelia; here only a few of the single cysts could be removed. From twenty-eight cases of such cysts, in medical literature with careful records, the author draws the following conclusions; Fifteen were in men, thirteen in women. Development generally begins in childhood or at the age of puberty; four times the tumor was congenital. As regards the location of these cysts the author is in harmony with the views expressed by Schede. Those originating from the second cleft are situated in the trigonum colli superius and developed in the space between the mastoid process and the hyoid bone, generally lying parallel to the border of the lower maxilla. Those of the third cleft lie between the thyroid cartilage and the sterno-mastoid muscle, and if large can extend underneath that muscle. The cysts of the fourth cleft develop in the supraclavicular

fossa. The twenty-eight cysts collected by Renard can be classed as follows :

9	of	the	II	branchial	cleft..
15	"	"	III	"	"
3	"	"	IV	"	"

On the other hand. branchial fistulæ are most frequently found in connection with the third and especially fourth cleft.

The contents of the cysts varied from a clear serum to a thick atheromatous mass. In two instances there was found a blood fluid, and the cyst cavity in one of these was in direct communication with the internal jugular vein. In nineteen cases the cyst was lined with tessellated epithelium. in five with columnar and ciliated. In four cases the cyst walls contained elements of the skin, hair and sebaceous glands ; in all cases they consisted to a great extent, of connective tissue in its manifold varieties. Three cysts were multilocular. Cosmetic considerations generally influence the bearer in seeking medical advice. The diagnosis is based upon the location and the distinct fluctuation, which is always present when the cyst is intact and movable below the integuments. At times these tumors are adherent to the sheath of the large vessels. To insure a correct diagnosis puncturing of the cyst can be resorted to ; the microscope will reveal epithelial cells, fatty detritus and cholesterin crystals.

The best treatment is excision, which was successfully practiced in twenty-six cases. Puncturing and consecutive injection of irritating fluids are objectionable as leading to prolonged suppuration and adhesions with the surrounding tissues that render later excision very difficult.

Two abscesses of the branchial clefts were treated at the clinic in Tuebingen. The patients aged 43 and 19 years, developed them on the right side of the neck, and these when incised were perceived to be contained in a sack presenting all the characteristics of a cyst wall. The etiology of suppuration became apparent in neither case. The patients were not the subjects of scrofulous disease, nor had any treatment been adopted which might have led to an infection from without. Senn has described a similar case.

After reference to the cases of carcinoma previously published by

Volkman (1882), Bruns (1884), Silcock (1887), and Czerny (1887). Renard communicates two new observations of Prof. Bruns besides the former case. In one of them a tumor the size of a hen's egg, was situated in the trigonum colli superius; integuments covering the same normal and movable; the inner surface of the cavity found on incising tumor is studded with small, hard and smooth protuberances; from the surface cell-cylinders of tessellated epithelium project into the deeper tissues. In the other a tumor the size of a double fist had developed within five months, on the right side of the neck; skin over tumor intact; tumor in no connection with cavity of the mouth, pharynx, or larynx; fluctuation distinct; puncturing yields a cloudy yellow fluid, containing many epithelial cells; microscopical appearance of the cyst wall similar to that in first case. In the third patient a flat tumor had been noticed from earliest childhood as the seat of the carcinoma. A year before the later began to grow, the patient had a severe inflammatory attack in the original tumor, terminating in suppuration and incision, and a fistula had remained. The diagnosis of a carcinoma that had developed on a cyst of the branchial cleft, which had undergone suppuration was corroborated by the microscope. The seat of the tumor in all these three cases was the trigonum superius. In his concluding remarks the author believes that since attention has now been frequently called to this class of tumors, they will no more be considered of very unusual occurrence.—*Beitrag zur klinischen Chirurgie Mittheilungen aus der Chirurg. Klinik zu Tuebingen. herausgegeben von Prof. Dr. Paul Bruns*, Bd. iii, Heft 2.

III. On Cachexia Following Extirpation of the Thyroid Gland. By P. BRUNS (Tuebingen). The author does not accept the opinions expressed by various authors about the cause of cachexia strumipriva, such as insufficient supply of oxygen following atrophy of the trachea (Kocher), decrease in the capacity of the rima glottidis from nerve-lesions (Baumgärtner), lesions of various other nerves during operation (Mikulicz, Gussenbauer, G. Wolff), vasomotor disturbances (Reverdin). He also strenuously opposes Bardeleben and Maas, who have held that no causal relation existed between

extirpation and cachexia. He supplements his former publication on this subject by the communication that in all his four cases of total extirpation well marked symptoms of cachexia have now developed. Other surgeons have seen cachexia follow only in some of their operations. Bruns thinks such cases have not been under observation for a sufficient length of time, or that at the operation parts of the gland were not extirpated, and hypertrophying, as they always do, have assumed the function of the original gland. In dogs Fuhr found at least one-third of the whole gland must not be removed if cachexia shall not set in; in man less will according to all probability, answer the same purpose. It is interesting to note in this connection that cachectic symptoms may develop soon after the operation, to disappear again later on, as soon as the remaining part of the gland begins to increase, and several surgeons have expressed the belief that the part not removed at the operation was too small to immediately replace functionally the entire thyroid gland. In cases where cachexia does not come on, we have often to deal with accessory thyroid glands, which act similarly to parts of the thyroid itself not extirpated. The author tells of a man who had undergone total extirpation of the thyroid at the hands of Prof. Wölfler, then in Vienna, and who presented himself at Tuebingen many years later without symptoms of cachexia, but with a new tumor the size of a hen's egg, occupying the space between the hyoid bone and the thyroid cartilage. The microscope revealed normal thyroid tissue in a small piece excised for investigation. The operation of removal sought for was then promptly refused. Only of late have anatomical investigations been made with regard to these accessory glands. We may distinguish median (upper and lower) lateral and posterior. Only the upper median have been accurately described (Zuckerkandl, Streckeiser). They are found in fifty per cent of all the living, are associated with a middle lobe (Pyramid) or occur without it, occupy the space above the isthmus of the gland, reaching above the hyoid bone and occasionally even penetrate into this bone itself. The lateral glands lie anywhere between the clavicle and the lower jaw in the lateral parts of the neck. The lower median lie below the isthmus and always in the median line, and the posterior accessory glands are

always found at the entrance of the pharynx into the esophagus. Rarely do we find accessory glands within the trachea. The author calls attention to the identity of symptoms in cachexia strumipriva and myxœdema, and relates a case of the latter of now fifteen years duration. It follows that he is an advocate of partial excisions. Extracapsular enucleation as recommended by Julliard and Socin, is warmly espoused by Bruns for cystic and small parenchymatous tumors. In other cases he prefers extracapsular extirpation, on account of the severe hæmorrhage now and then occurring during enucleation. In multiple cysts and tumors enucleation is also impracticable, as each has to be individually enucleated and the resulting condition of the wound is complicated and unfavorable to primary union. [In the face of all that has been lately published about the treatment of goitre, we are somewhat astonished to find in one of the late numbers of the *Lancet* a treatment of cystic goitre recommended which seems to us most unsurgical, tapping and injection of perchloride of iron, which is retained in the cyst for seventy-two hours and repeated if suppuration has not set in; the temperature during this treatment generally varies from 100° to 103° F. Ed]. Regarding the recurrence of thyroid tumors, Bruns thinks this is often observed, as Riedel, Küster, Mikulicz and Socin have also stated, but such recurrences very rarely re-establish the status quo ante with reference to the inconveniences and dangers of primary thyroid tumors. This may become more apparent when we hear that in over 100 such cases of the clinic at Tuebingen in not one did a second operation become necessary.—*Beiträge zur klinischen Chirurg. Mittheilungen aus der Chirurg. Klinik zu Tuebingen*, Bd. iii, Heft 2.

IV. Enchondroma of the Larynx. By P. BRUNS (Tuebingen). The rarity of cartilaginous tumors of the larynx is apparent when we hear that with the case on record here, only fourteen cases can be gathered from medical literature. The cricoid cartilage was the seat of such tumors in eight cases; in four others the thyroid, and once the arytenoid. They generally grow towards the lumen of the larynx and have on several occasions necessitated tracheotomy; they scarcely

ever attain a size larger than a walnut. If practicable, such tumors should be removed by the intralaryngeal method; but this is rarely the case considering their hardness. Preliminary tracheotomy or laryngo-tracheotomy must then be performed. During the operation the laryngeal cartilages ought to be preserved, if at all possible. A thorough removal of the growth is the best safe-guard against its recurrence, however. But then, the removal of the cricoid cartilage has necessitated the continued use of the cannula, and rendered articulation very imperfect.—*Beitrag zur klinischen Chirurgie. Mittheilungen aus der Chirurg. Klinik zu Tuebingen.* Bd. iii, Heft 2.

FRED KAMMERER (New York).

V. Occlusion of Left Bronchus by a Foreign Body: Successful Treatment. By Dr. W. D. CHEADLE (London), and Mr. THOMAS SMITH (London). The patient, a girl of 9 years, inhaled a loose metal cap from the end of a pencil. Urgent dyspnœa and choking immediately followed. A probang was passed, and appeared to give relief, and it was inferred that the cap had been pushed on into the stomach. Complained of great pain and cough and four days later impaired resonance and imperfect entry of air were noticed on the left side of chest. Eleven days after the accident marked dulness over whole of left side, absence of respiratory murmurs except over a limited portion of the upper part in front, displacement of stomach upwards to nipple line; great retraction of left half of thorax, indicating almost complete collapse of lung; no dyspnœa, but occasional short cough, aggravated by exertion. The conclusion was that the cap, which was about one inch long and a quarter of an inch in diameter, had lodged in the extreme end of the left bronchus. It was decided to attempt removal of the foreign body before the supervention of serious inflammation of the lung. Suitable instruments were planned ready for dealing with the body. The isthmus of the thyroid was divided between two ligatures and the trachea freely opened, and the edges held apart by two silk sutures. A long probe was passed and at once detected the cap in the position assigned to it, with the open end uppermost. The forceps were introduced, and it was extracted

without difficulty. The plan of attaching the tracheal wound to the skin is recommended as serving to keep the tracheal wound widely open—a help to the surgeon and a source of safety to the patient. The patient made an uninterrupted recovery; the lung slowly re-expanded, and a final examination of the chest fourteen days after the operation disclosed as the only abnormal physical sign slight deficiency of respiratory sound and of expansion on the left side. The entrance of the foreign body into the left bronchus instead of the right is shown to be by no means so rare an occurrence as commonly believed. Out of thirty-three cases collected in which the position of the foreign body is stated, it entered the left bronchus in eighteen instances, the right in thirteen.—*Lancet*, Jan. 14, 1888.

H. H. TAYLOR (LONDON).

CHEST AND ABDOMEN.

I. Case of Stab (Knife) Wound of the Abdomen with Lesion of the Stomach.—By Dr. NIKOLAI M. BENISOVITCH (Odessa, Russia). A peasant, æt. 18, when one night leaving a *traktie* (tavern) after having imbibed a large amount of tea, was suddenly stabbed in the abdomen with a large pen-knife by a stranger standing at his side. Shortly afterward he was brought to the Odessa Town Hospital in an extremely depressed and apathetic state, with a weak, quickened pulse, incessant nausea and great pallor. On removing a dirty rag saturated in blood from his belly, a piece of the omentum was found protruding from a bleeding clean cut transverse wound, measuring 2 cm. in length, and situated four fingers' breadth from the left costal margin and about a similar distance from the middle line. Having duly disinfected the parts, Dr. Benisovitch tied the prolapsed portion of the omentum with five catgut ligatures and cut it away above them, the piece removed measuring 8x15 cm. A drainage tube was inserted, and the wounds stitched with catgut, dressed antiseptically and covered with icebags, while internally a full dose of opium was administered. Two hours later an incessant oozing of blood from the lesion commenced, continuing for nine hours. Without any further loss of time, the lad was anæsthetized, the sutures removed and the wound enlarged by a cruci-

form incision. The whole abdominal cavity was found to be filled partly with fluid blood, partly with clots of various sizes, some of which were closely adherent to the viscera and peritoneum. After carefully removing the blood, the small intestine and omentum were explored (outside of the abdomen), with the object of finding the source of the hæmorrhage. No bleeding points came to sight until the centre of the great curvature of the stomach was reached. In this situation there was discovered a clean-cut wound, 4 cm. long, penetrating through the serous and muscular coats of the organ (*the submucous and mucous being intact*), and dividing several small branches of the gastro-epiploic artery and vein. The bleeding vessels were ligatured, the gastric wound stitched, the viscera and peritoneal cavity washed out with a tepid solution of thymol, dried with a sponge, and the abdominal incision closed and dressed after inserting a drainage tube. During the first four days the patient suffered from obstinate nausea with vomiting, and unquenchable thirst; there were also some abdominal distention, slight jaundice, slight fever (38.2° C.), while about one and one half tablespoonfuls of a sanious fluid was removed from the drainage tube by suction with an ordinary glass syringe. On the fifth and sixth day a marked general improvement set in, but then a severe attack of croupous pneumonia suddenly made its appearance. On the tenth day after the accident the wound was healed *per primam* and the sutures were, accordingly, removed. In spite of the abdomen being most carefully bandaged, on the eleventh day, during a violent paroxysm of cough, the cicatrix burst, and several intestinal loops prolapsed through the gaping wound. Again the abdominal cavity was sponged out, the viscera reduced, the edges of the wounds refreshed, a drainage tube inserted and the wound closed. Notwithstanding all these grave complications, on the twenty-second day after the accident the wound was found again united by first intention, except at the site of the drainage, where some fungous granulations developed, to disappear after a couple of cauterizations with solid nitrate of silver.

About the same day a steady and rapid resolution of the pulmonary process commenced, and after forty days' stay at the hospital the lad was discharged quite well and sound. So strikingly successful a ter-

mination of so grave and complicated a case is ascribed by Dr. Benisovitch to a strictest possible antiseptic management from the beginning, and above all to establishing and scrupulously keeping up a thorough drainage. Analyzing his case the writer dwells especially on the following points: 1. In the whole international literature accessible to him he was able to find only one case where an already cicatrized abdominal wound burst under conditions like those in his patient. It is the case of Dr. Tchaïshansky where herniotomy had been performed, and the whole wound had healed *per primam* at due time to give way shortly afterwards under the pressure of severe cough efforts. The prolapsed bowels were disinfected and returned into the abdomen, the patient making good recovery. 2. Cases of traumatic lesions of the stomach are comparatively very rare both in military and civil life. Thus of 3717 gunshot penetrating wounds of the abdomen, registered during the War of the Rebellion in the United States, the stomach was wounded only in 79. Its stab wounds are met somewhat more frequently, but they include then, in an overwhelming majority of the cases, all coats of the organ, while in Dr. Benisovitch's patient only the serous and muscular layers were involved. This singular circumstance is attributed by the writer to the fact that, at the time of the injury, the lad's stomach was distended with tea, while, on the other hand, the weapon being thrust from a side, touched the organ at a tangent, only gliding over its surface. 3. The case beautifully illustrated those highly beneficent teachings of Marion Sims, Senn, William MacCormac, etc., according to which a patient suffering from an abdominal wound, when subjected to a rational active surgical treatment, has as many chances for recovery as a woman suffering from an ovarian tumor and treated by ovariectomy.—*Khirurgicheskyy Vestnik*, No. 2, 1887, p. 887.

II. Case of Stab (Knife) Wound of the Abdomen, with Multiple Lesion of the Small Bowel. By DR. MIKHAIL I. GOSHEVITCH (Kherson, Russia). A middle-aged peasant was stabbed in the shoulder, chest and hypogastrium the weapon being a large clasp knife. A district practitioner, Dr. Kozelsky, happened to pass

through the (doctorless) village at the moment, and was at once brought to the injured man. The latter was found lying on the floor in an almost unconscious state with a large portion of his intestines, covered with earth and litter, protruding from a vertical clean-cut wound in the right side of the hypogastric region and measuring about $13\frac{1}{2}$ cm. in length. A large quantity of semi-liquid faecal matter was seen escaping from several parts of the small bowel. A careful examination showed that at one spot the intestine was perforated through both sides, the apertures easily admitting a finger, while in two other places there were detected only one-sided perforations of a smaller size. All four intestinal wounds were closed with a silk suture, the parts washed out with a tepid carbolic solution, the prolapsed mass returned into the abdominal cavity, and the abdominal wound sutured with silk. The lesions of the man's shoulder and chest proved only superficial. Having rendered this first (and last) aid, Dr. Kozelsky continued his route. The man, therefore, remained from this moment without any medical attendant or any trained nurse. When examined by the local coroner and a medical expert twenty-three days later, he stated that he was "all right;" his abdominal wound was found to have healed except at one spot where some slight suppuration still persisted. Dr. Goshkevitch saw, and spoke to him about six months after the forensic examination, when he again declared that he was quite healthy, and certainly appeared so.—*Rüsskaia Meditsina*, No. 19, 1887, p. 329.

III. Case of Stab (Dagger and Knife) Wounds of the Abdomen with Prolapse of the Omentum and Bowels. By DR. GEDEVANOFF (Mikhailovsky Zaliv, Transcaspian Region, Russia.) An anæmic, emaciated, weakly built merchant, æt. 22, stabbed himself into the abdomen with a dagger and a blunt pen-knife. When seen by Dr. Gedevanoff, twelve hours later, the man was lying in a pool of blood in his tent. He was in a deep swoon, deadly pale, with an almost imperceptible pulse. Five gaping wounds of the abdomen, two of them penetrating into the peritoneal cavity and giving rise to the protrusion of a portion of the omentum and an intestinal loop presented themselves; all the stabs were

filled with blood-clots. Neither anatomical relations, nor size and shape of the wounds and prolapsed parts are given. Having removed the clots and washed out the parts with a 5 per cent. carbolic solution, the writer returned the viscera into the abdominal cavity, stitched the holes with an ordinary sewing needle, applied an antiseptic dressing, and fixed it with a roller bandage in order to send the patient at once to the local lazaretto. A violent septic general peritonitis set in immediately. On the 4th day the dressing and sutures were removed, a large amount of sero-purulent exudation escaping from the abdominal cavity. The subsequent treatment consisted in irrigations with a solution of corrosive sublimate (1 to 1,000), iodoform dressing, bandaging the abdomen, absolute rest on the back, and the administration of opium, valerian and wine. Up to the 6th day the patient's state seemed to be quite hopeless. But from 7th a marked improvement appeared, progressing under the influence of a nutritious diet and a careful nursing so rapidly that in a fortnight the young man was able to get up and walk for a short time daily. On the 36th day after the accident he was discharged well and strong, with his wounds firmly cicatrized and with nothing abnormal generally beyond some slight tenderness on pressure about the region of the lesions. Dr. Gedevanoff feels sure that the man's recovery should be attributed wholly to the antiseptic means employed.—*Meditzinskoië Obozrenië*, No. 1, 1887.

IV. Case of Stab (Knife) Wound of the Abdomen, with Protrusion of the Omentum and Bowels. By DR. A. A. TERNOVSKY, (Russia). A peasant woman, æt. 30, of middling make and height, in the sixth month of pregnancy, left her house stealthily at about noon, and stabbed herself in the abdomen, with a large kitchen (carving) knife. She was found, with protruding omentum and bowels, in the field, not earlier than at 5 P. M. A female neighbor of hers returned the viscera into and "whipped-stitched" the skin with ordinary darning thread and needle, after which the patient could be carried home by the people on their arms. When fetched to the woman at 7 P. M., Dr. Ternovsky found that the wound, measuring about 10 cm., was situated at the middle line, beginning at the base of the ensiform cartilage

and terminating two fingers' breadth from the navel. It was clean-cut and penetrating through the thickness of the abdominal wall in a somewhat oblique direction, from the left to the right. In the region of the xiphoid process the lesion was superficial (cutaneous), but lower down it included all layers of the wall, so that at the bottom of the wound there were seen the omentum, a portion of the liver, and a portion of the stomach. Since the viscera exposed seemed to be quite intact, while, on the other hand, the woman who had stitched the wound preliminarily, emphatically assured the author that the bowels had been also uninjured and, in addition, quite clean—he limited his cleansing manipulations only to wiping the exposed viscera with a few bits of cotton wool soaked in a two per cent. carbolic solution, and then proceeded to close the whole wound with three catgut sutures (peritoneum and muscles), six deep silk ones (muscular and skin), and twelve superficial silk ones (skin alone). No drainage was inserted, in view of the absence of any hæmorrhage.

The wound was then powdered with iodoform, an antiseptic dressing applied, and twenty drops of simple tincture opium (Ph. Russ.) administered internally. On the next day the patient was removed to a hospital, about five miles off, vomiting occurring on the way. During the following ten days the woman was quite free from any pain or vomiting, the morning temperature remaining normal, the evening one oscillating between 37.6° and 38.9° . On the ninth day the dressing and sutures were removed, the former proving to be quite dry, the lower three-fourths of the wound were found to be united *per primam*, while in the upper fourth the cutaneous lips were gaping, though the deeper parts showed a firm adhesion. On the eleventh day the woman began to complain of pain about the lesion, the temperature suddenly rising up to 39°C . On the twelfth, it ascended up to 41.2°C ., while the lower portion of the wound became swollen and hard, the stools, the first after the accident, being liquid and offensive. Dr. Ternovsky tore open the lower angle of the wound with a probe, but nothing escaped at the time. On the thirteenth day, however, the re-applied dressing was found to be soaked all through with purulent matter possessing a fecal odor and containing a free admixture of a bo-

vine as well as equine *dung*." A drainage tube was then introduced and an antiseptic irrigation made for two days, after which recovery progressed without any complications, the wound rapidly healed, and on the thirty-fourth day the patient was discharged in excellent health.

Analyzing his case, Dr. Ternovsky frankly expressed his regret that he, having implicitly trusted the preliminary stitcher's statements, did not make a careful and thorough toilette of the abdominal cavity, and through this neglect exposed his patient to such complications as a suppuration with a high fever.—*Meditzinskiĭ Obozreniĭ*, No. 2, 1888.

V. Case of Stab (Knife) Wound of the Abdomen with Protrusion of the Omentum. By Dr. ALEXEEF (Kniagin, Russia). A peasant boy, æt. 8, when playing with a jack-knife, stabbed himself in the epigastric region. When brought to Dr. Alexeef, about a day later, a transverse clean cut wound, one-half inch long, was found one and one-half inch from the costal arch, and one inch to the right of the middle line. A (highly œdematous and congested) piece of the omentum, of the size of a walnut, was protruding from, and tightly strangulated in, the wound. Without any delay, the author washed out the parts with a solution of resorcin, divided the pedicle into two portions, ligatured each separately, cut away the tumor above the ligatures and applied an antiseptic dressing. Neither local nor general reaction was noticed. A week later the boy left, with his wound healed. He remained in best health when seen some time afterward.—*Russkaia Meditzina*, No. 5, 1887, p. 95.

VI. Case of Stab (Knife-like Ferrule) Wound of the Abdomen with Protrusion of Bowel. By Dr. NIKOLAI I. TEZIAKOFF (Ariaja, Perm Government, Russia). A healthy, powerfully built peasant woman, æt. 53, when one night drinking *vodka* with two male neighbors, was suddenly attacked first by one of them, who thrust a staff armed with a pointed iron into her abdomen, and subsequently, after she had fallen, by both of her companions who, while continuing to deal blows, tried to strangle her. "The woman developed a most

energetic resistance, the struggle lasted very long," till her screams and cries were heard by villagers and help arrived. After the scoundrels had run away, she rose from the floor, locked the door, and only then lost her senses, bleeding from all her wounds. The only other human being residing with her was her daughter, æt. 18, who could not possibly render her any aid, since she herself lay similarly prostrate, having received eight wounds about her head and lost her right ear during a simultaneous struggle for life and death with a third scoundrel. The tragedy took place at a lonely, doctorless village, about 30 miles from the Añaja Zemsky Hospital, conducted by Dr. Teziakoff. The distance being so considerable, and an abominable rustic road having been made still worse by autumn rains, Dr. Teziakoff was unable to reach the victims earlier than 24 hours after the occurrence. On his arrival at the spot, he found the small hut chokefull of people, the old woman lying on a bare wooden bench, loudly moaning, in a depressed state. She was pale and complained of an agonizing abdominal pain. Her belly was wrapped in a mass of dirty rags. The latter being removed, a bluish rosy loop of the small bowel was found strangulated in a clean cut wound measuring 4 cm. in length, and situated at $2\frac{1}{2}$ cm. below the navel, slightly to the left from the middle line. Having washed out the parts with a 2 per cent carbolic solution, the writer reduced the prolapsed intestine, without any special difficulty, stitched the wound with silk sutures, powdered it with iodoform, and applied an antiseptic dressing. A number of wounds, partly subcutaneous, partly fairly deep, were present besides, on the chest, near the mammæ, neck, hands and back; in the latter situation there was found a flap of the "size of a child's palm," including skin and muscles, down to the vertebræ. The weapon with which all these injuries were said to be inflicted, was a stout crutch with an iron ferrule, having the shape of a blunt-edged table knife, and measuring about 18 cm. in length. The whole iron was covered with manure, and above the latter, with blood. The woman, (together with her daughter) was removed on the next day, the second after the accident, to the Añaja Infirmary, where she was treated by rest, ice-bag, irrigation with a solution of sublimate corrosive (1 to 1000) and antiseptic dressing, changed

every two or three days. No drugs were given. There was some abdominal pain for the first three or four days. The temperature never rose above 37.8° C. On removing the sutures on the seventh day, the abdominal wound was found healed *per primam*. On the 20th day she was discharged in best health. The author draws attention (1) to the fact that any viscera could escape injury in spite of the weapon having been thrust with a grown man's full strength, and having penetrated very deeply into the abdominal cavity; and (2) that so excellent a recovery could be attained in an old woman, in spite of the weapon being thickly coated with dung, the prolapsed and strangulated bowel being covered with useless dirty rags for 24 hours, the loss of blood being great, and the removal of the wounded woman from her home to the hospital taking place under such unfavorable circumstances as an extremely rough and long route and incessant cold rains.—*Meditzinskiĭ Obozreniĭ*, No. 1, 1887.

VII. Case of Stab (Knife) Wound of the Abdomen with Prolapse and Lesion of the Small Bowel. By DR. D. BEKLEINSHEFF (Russia.) A healthy and well nourished field labourer, æt. 17, was unintentionally stabbed in the abdomen by his mate. When seen by Dr. Bekleinsheff (a local country or *zenisky* practitioner) five hours later, the lad lay moaning and writhing about on a sleeping loft at a small (one roomed) hut inhabited by a crowd of laborers. On removing from his body a heap of dirty rags, the whole abdomen was found to be covered with highly distended and congested intestinal loops, amidst which the omentum was visible here and there. A round worm and soft fecal matter present amongst the loops showed unmistakably that the weapon had penetrated the bowel somewhere. A careful exploration which caused vomiting led to the detection of a transverse wound about 3 centimeters long, which was then stitched with 3 nodular catgut sutures. The abdominal wound measured only 4 cm. and was situated along the middle line, commencing just under the umbilical ring. Having washed out the parts with a (1 to 2000) solution of corrosive sublimate, Dr. Bekleinsheff attempted to return the viscera into the abdominal cavity. He met, however, a stubborn resistance on the

part of the lad who, on every pain caused by the manipulation, at once commenced to writhe and "to puff himself up." There was not a single assistant present; and the room was small and as hot and sultry as only a Russian room in January could be. And yet there was nothing to be done except to cover the viscera with a piece of iodoform gauze and to bring the struggling patient under the full influence of chloroform. And so the author actually did, after which the reduction could be effected in the easiest manner. Having then closed the abdominal wound with two silk sutures including the whole thickness of the wall, the writer irrigated the parts with the sublimate solution, powdered with iodoform, applied a wadding dressing and placed the lad on a better bed. The after-treatment consisted in an absolute rest on the back, ice-bag, morphia hypodermically, and a strict diet limited to boiled milk and oat-porridge. For the first three days the patient was extremely collapsed and suffered from pain, delirium, vomiting, dyspnœa, and fever, (40.0° c.)—in short, was thought lost. But from the fourth day a steady improvement ensued. On the sixth, the dressing and sutures were removed. On the thirty-fourth day he was as well as possible. Pointing to his encouraging case as well as to those of Drs. Gedevanoff, Teziakoff, Alexeeff, etc., and referring especially to the circumstances under which an average Russian *zemskey* (country) practitioner must do his work, Dr. Bekleinsheff observes that "the practitioner of this kind, only too often finds himself in conditions, in which one can venture to render a rational medical aid only after summoning one's whole strength and courage." One single assistant is the pure country air: to its agency the fact should be attributed that the rustic dirt does not give rise to such harmful consequences as are daily observed in towns in absence of an ideal cleanliness.—*Meditzinskoïe Obozrenië* (Moscow), No. 15, 1887.

VIII. Two Cases of Penetrating (Horn and Scythe) Wounds of the Abdomen with Protrusion of Viscera. By DR. D. BEKLEINSHEFF (Russia). I. A peasant boy, æt. 13, when attempting to lead away a new born calf from an angry cow, was gored by the latter in the right groin, an intestinal loop protruding from the

wound. The latter measuring $3\frac{1}{2}$ cm., was without delay and without reducing the loop "whip-stitched" by a local *znakharka* ("wise woman") with coarse darning threads as used by peasantry. Five hours later, Dr. Bekleinsheff found the boy quietly lying on the floor in the cottages hall and complaining only of pain in the groin where a large subcutaneous tumor was seen. Having brought the patient under the influence of chloroform with the assistance of a medical student, Dr. Bekleinsheff, cut through the preliminary sutures. A number of intestinal loops suddenly escaped from, and became fixed in the wound. A slight enlargement of the latter proved necessary to return them into the abdomen. Scarcely could the last loop be reduced, when a strong jet of blood gushed out of the wound. Without searching for the source of the bleeding, the writer promptly stitched the lesion and, after covering the part with numerous layers of compresses and wadding, tightly bandaged the whole abdomen. The boy commenced to get up on the seventh day and was quite well in three weeks. No pain, no fever—in short nothing abnormal could be observed during his rapid convalescence. II. A male peasant, æt. 35, lay in a drunken sleep with his scythe. When he awoke on the next morning, he found that "there was something sticking out of his belly." Twenty-four hours later he was brought to the author without complaining of anything in particular, beyond the phenomenon just named. There was seen in his left groin a clean-cut wound $3\frac{1}{2}$ cm. long, from which a piece of the omentum measuring about 9 cm. in height and richly covered with debris, was protruding. The prolapsed part was tightly tied at its base with catgut and cut away above the ligature, after which the pedicle was thoroughly disinfected and returned into the abdomen, and the wound sutured, dressed with iodoform and covered with ice-bag. The wound healed *per primam* about the fifth day. There was never any fever or pain. On the seventh day the man walked away.—*Meditzinskoï Obozrenië*, No. 2, 1888.

IX. Case of Gunshot Wound of the Abdomen with Perforation of Bowel. By DR. KONSTANTIN I. KOLPIN (Samara, Russia.) At a meeting of the Samara Medical Society, Dr. Kolpin

communicated an interesting case of an anæmic, weakly-made German colonist, æt. 24, who had accidentally shot himself when tempering the breech of an old gun with its muzzle firmly pressed against his abdomen. On examining the man three hours later, the author found a clean-cut circular wound, about 1 cm. in diameter, situated 5 cm. above the middle of the right Poupart's ligament and encircled with a bright red œdematous zone. The patient complained of intense abdominal pain, his breathing was quickened and shallow, but the pulse was hard and full. A carbolic dressing was applied, and low diet, chopped ice and opium ordered. On the third day the temperature rose up to 39.8°C. while the neighborhood of the wound assumed a dark color, and a yellow-green fluid with a fæcal odor began to ooze from the aperture. Operative treatment (laparotomy with suturing the wounded bowel) was proposed by the author, but firmly declined by the patient. On the fifth day a normal stool *per anum* followed, after which the man stated that he felt more comfortable. On the fourteenth day he consented to be removed to the Koshkinsky Hospital where his wound was found to be somewhat enlarged and incessantly discharging an offensive foamy fæcal fluid. A digital exploration detected a small cavity filled with liquid fæces. On the twenty-eighth day the discharge ceased, but below the lower segment of the wound there appeared a fluctuating, excessively tender swelling of the size of a goose egg, while the temperature increased to 40°C. and for the next four days oscillated between 38.5° and 39.5°C. About the thirty-third day, however, a flow of the fæcal matter from the fistula recommenced, the swelling gradually melted away, the temperature returned to the standard, and the patient's state began to markedly improve. Any operative interference for closing his preternatural anus was rejected by the man. From the fortieth day normal regular daily stools *per anum* were re-established, the discharge from the fistula rapidly lessened and the lesion itself commenced to cicatrize. On the fifty-ninth day the man left quite well, with his wound closed. In the course of a discussion in connection with Dr. Kolpin's paper, Dr. V. V. RODZEWICZ stated that he had seen a case of sloughing of an irreducible hernia with formation of a preternatural anus. The latter had closed spontaneously in 2 months.

DR. N. N. GOLOVIN narrated a case of a penetrating wound of the abdomen with protrusion of a portion of the omentum. The patient, a male peasant, had treated himself by tightly ligaturing the prolapsed part with a string. After a while the part sloughed away, and the wound healed. There was no fever at any time.—*Proceedings of the Samara Medical Society*, No. xxxvi, p. 28.

VALERIUS IDELSON (Berne.)

X. Laparotomy for Gunshot Wounds of the Abdomen.

By J. B. MURPHY. M.D. (Chicago, Ill.) Four cases are related, in two of which the intestines were perforated, in one the liver only was perforated, and in the fourth perforations were found in the stomach and mesentery. The second and third cases which recovered were as follows: (1) A colored man, æt. 22, was shot in the abdomen, two inches to the right of the median line and an inch above the umbilicus, the bullet passing directly through the liver and lodging in the muscles of the back. The hæmorrhage had ceased when the abdomen was opened; accordingly the blood and clots were removed and the belly closed, the patient making a good *recovery*. (2) A colored man, æt. 57, received a 38 calibre bullet wound passing through the liver three-fourths of an inch from its lower margin and perforating the colon, leaving a bridge of intestinal tissue half an inch in length, between the perforations. The bridge was divided and the single opening thus created closed, and the abdominal wound united after a careful peritoneal toilet had been made. Primary union occurred and the patient made a perfect *recovery*. The two other cases both died, one from hæmorrhage from the renal artery, the other from shock complicated by an overdose of morphine.—*Jour. Am. Med. Assn.*, March 10, 1888.

JAMES E. PILCHER (U. S. Army).

EXTREMITIES.

I. On the Operative Treatment of Elephantiasis. By PROF. DR. HELFERICH (Greifswald). The treatment of simple cases of elephantiasis of the extremities by means of elastic compression.

massage and elevation, has undoubtedly shown very good results. In the less severe cases where the treatment is instituted early enough, complete recovery may take place without the patient having to wear these annoying appliances. In the more severe cases it is possible to restore the limb to nearly its normal size, the treatment being continued by the patient himself, by the use of an elastic stocking, etc. The liability of the disease to recurrence if these latter precautions be neglected, is well known. An interesting case of this kind was reported by J. Sendtner in 1884. Under treatment with massage the adipose tissue of the limb disappears quickly enough, leaving, however, the skin hanging in loose folds. "In a word", says the author, "the stretched cutis has partly lost its elasticity." He advises, therefore, excision of larger or smaller portions of the cutaneous covering of the limb, of a length and breadth corresponding to the folds which may be gathered up in the hands.

The skin will then, when sutured, give more or less support to the limb. Of course, a radical cure of the disease itself is by no means attained in this manner, but the conditions for further treatment, especially on the part of the patient himself, are much improved. Exact union of the edges of the wound is necessary, and the author advises operating with Esmarch's bandage, sutures and dressing to be applied before its removal. The thickened subcutaneous connective tissue in the defect should be excised down to the fascia. Strict antisepsis is advisable. The external side of the lower leg is best adapted to the removal of a large portion of the skin. After healing has taken place, development of the muscular structures of the limb should be undertaken, the latter being supported by a flannel bandage. Author gives the case of a female patient, *æt.* 57, who for many years had suffered from attacks of erysipelas, beginning generally in one of the lower extremities and spreading over the whole body. These attacks came on about once a year. When seen, both legs were about double the normal size. Forearms and hands also showed a slight enlargement. After treatment by means of compression, massage, etc., for some time, excision of large longitudinal flaps of the skin was undertaken, first on the right leg and foot: two months later on the left leg. No Esmarch

was used in the first operation, and there was consequently considerable parenchymatous hæmorrhage. Healing per primam took place. Limbs greatly reduced in size and almost of normal appearance. On the left leg the fold of skin excised, reached from the head of the fibula to and around under the external malleolus. A second portion was excised on the external upper part of the foot. Electricity and massage (not rubbing) were employed afterwards. Patient was not allowed to get up for some time, in fact, not entirely until about four months had elapsed. Several months after her discharge her condition was excellent, the muscles of the lower extremities being strong and the power of locomotion very good. She died suddenly from a violent attack of erysipelas.—*Deutsch Med. Wochenschrift*, No. 2. Jan. 12, 1888.

C. J. COLLES. (New York).

II. On a Deformity of the Hands which Attacks Glass-Blowers. By A. PONCET (Lyons). There exists in glass blowers a professional deformity of the hands, to which attention has not hitherto been called. It is characterized by a permanent flexion of the fingers upon the hand. The little and ring fingers are more flexed than the middle and index. The thumb is free. The flexion especially affects the second phalanx, which is inclined almost at a right angle to the first phalanx. It is not due to thickening of the skin or to fibrous bands, but to contracture of the flexor tendons and especially of the flexor sublimis. This can be made out by careful examination under chloroform.

The inter-phalangeal articulations are more or less deformed with a tendency to subluxation. The fingers are inclined towards the ulnar side.

The skin on the palmar aspects, though a little thickened and callosous, is not more so than may be observed in work-people of other professions.

The deformity is known among French glass blowers as *main en crochet* and *main fermée*. According to the observations of one of Poncet's internes, M. Etienne Rollet, the greater number of glass-

blowers present this lesion and the longer they have worked the more marked it is found to be.

The mechanism of its production is easily understood. Glass-blowers employ a tube, 20 centimetres long and weighing two kilogrammes. to which they give a rapid movement of rotation between their closed hands. They work from eight to ten hours a day, according to Poncet, holding the tube all the time. The complaint comes on gradually and progresses. When once formed it never retrogresses.

The glass-blower's profession is extremely laborious. It is followed by young men who give it up at about the age of thirty-five years. The "main en crochet" is found only in glass-blowers, and in no other workmen, alleges Poncet; but we cannot help thinking that many laborers accustomed to grasp the handles of implements, such as pick-axes and wheelbarrows, show a tendency to the same deformity, if not marked examples of it. It is also contrary to all analogy, and scarcely credible that contracture of tendons can exist for a lifetime without nutritive shortening of ligaments and other neighboring structures supervening.

The deformity seriously compromises the usefulness of the hands. It has often been the cause of exemption from military service.

C. B. KEETLEY (London).

III. On Tendon-Suture and Tendon-Plastic. By A. WÖLFLE (Gratz). The author's method is to pass whenever practicable, the suture once or better twice transversely through each tendon stump and then tie so as to bring the ends into apposition. After referring to the various other procedures general and special that have been proposed, he gives a case in which he used a modification of Guck's plan. This latter consists in the interposition of catgut-strands where the tendon stumps can not be brought again together. His case was one of two months old injury to the extensors of the right middle and ring fingers. To find the central stumps the common carpal ligament was divided. and later brought together again. The various stumps were found attached to adjacent intact tendons; when freed the ends were eight to nine cm. apart. This distance was cov-

ered by running both the catgut and a silk suture twice between the ends and then tying. However, as it was somewhat of an experiment he fastened the stumps also laterally to neighboring tendons. Later the silks were thrown off without suppuration (through small fistulæ). The patient began to extend the fingers from the twentieth day. Improvement continued until he was able to extend each finger separately as well as in the other hand. He thinks this could only have been possible by re-formation of fibrous cords along the catgut and silk threads.

To find the stumps he does not hesitate to open tendon-sheaths, reuniting them later with fine sutures. For immediate union of severed tendons he therefore recommends direct transverse tendon-suture, and for mediate union of retracted stumps the indirect transverse.—*Wien Med. Wchr* 1888. No. 1.

WM. BROWNING (Brooklyn).

IV. Successful Simultaneous Triple Amputation for Railway Injury. By JOHN ASHHURST, JR. M.D. (Philadelphia). A. Moor, æt. 20 years, was admitted to the University Hospital, November 28, 1887, having been run over on the Pennsylvania Railroad. Two hours after his admission the operator found a compound comminuted fracture of the right leg, the laceration extending above the knee; complete avulsion of the left leg, the limb having been torn off in its lower third; and a compound fracture of a severe character of the right hand and wrist. There was also a compound fracture of the skull, involving the frontal bone. This, however, was an impacted fracture without much depression, and did not require interference. In addition to these injuries, there were numerous brush-burns and contusions, some of a grave character. One upon the left buttock was so severe that the separation of the slough left a cavity fully two inches in depth. Notwithstanding these serious injuries, the patient's general condition was very good; he had reacted thoroughly, and his axillary temperature was 99° F. Under these circumstances the operator felt justified in proceeding to the immediate removal of the injured limbs, and amputated successively the right thigh by the antero-posterior flap method; the left leg, about its middle, by a modified Sédillot's exter-

nal flap operation, the modification consisting in making both flaps from without inward, instead of cutting the external flap by transfixion ; and the right forearm by an oval incision, making use of the uninjured skin of the back of the hand and wrist. After the operations were completed, the temperature had fallen only to 98° F. The patient had no bad symptom and rapidly recovered. The operator could find but four reported cases of successful spontaneous triple amputation. He considered rapidity of operation and keeping up the temperature of his patient, as the most important factors in securing a successful result — *Med. and Surg. Reporter*, April 7, 1888.

V. Successful Simultaneous Triple Amputation for Railway Injury. By A. ERNEST MAYLARD M. B. (Glasgow, Scotland). A middle-aged woman of robust constitution fell under the wheels of a moving car, suffering (1) a compound comminuted fracture of the bones forming the left knee-joint with considerable laceration of the soft parts above the joints ; (2) a complete severance of the right upper extremity, just below the middle of the arm, with the humerus projecting, splintered and freed of periosteum, and the surrounding soft parts much torn : (3) and a compound comminuted fracture of the index and middle fingers of the left hand. Two hours later, the patient not being markedly collapsed, was anæsthetized, and the following operations performed : (1) The left thigh was amputated by a “modified circular” operation at the junction of the middle and lower thirds, the skin flaps being obtained as well as possible ; (2) the exposed and bare portion of the humerus for about an inch, was sawed off, the brachial artery resecured by a ligature, and the muscles and other soft parts trimmed up ; (3) and the left index and ring fingers were amputated at the metacarpo-phalangeal joints. The wounds were treated antiseptically, and the patient made a good and rapid recovery. — *N. Y. Med. Journal*, June 2, 1888.

WOUNDS, INJURIES, ACCIDENTS.

I. Fracture of the Pelvis, Laceration of the Vaginal Wall and Protrusion of the Intestines. By M. H. RICHARDSON, M.D.

(Boston). A girl, æt. 5, was run over by a herd producing a fracture and separation of the pubic bones and a laceration of the vaginal wall from the cervix uteri to the pubic spine. The bowels were replaced and the vaginal wound closed with catgut; the pubic bones were wired together. The patient made a rapid and complete recovery.—*Boston Med. and Surg. Journal*, Sept. 8, 1887.

BONES, JOINTS, ORTHOPÆDIC.

I. Reimplantation of a Trephine Button of Bone. By HERBERT L. BURRELL, M. D. (Boston, Mass.) Reports a case of exploratory trephining in a boy, æt. 13, in which the button was placed in an antiseptic solution during the examination. It was then replaced and the periosteal flap and scalp sutured over it, the wound completely uniting in two weeks. The child dying eight months later, an opportunity was offered of examining the skull. The trephine button was found united by bony union throughout. The author suggests that this opens an important field for exploratory action, since the cranial opening can be cured even more readily than an abdominal incision.—*Bost. Med. and Surg. Jour.*, March 29, 1888.

II. Sarcoma of Bone Affecting the Lower Extremities. By FREDERIC S. DENNIS, M. D. (New York.) In connection with the discussion of a number of cases of this affection, the author dwells particularly upon: (1) The importance of carefully recognizing the disease and the necessity of complete removal of the limb by amputation without delay. (2) The importance of carefully watching the subsequent history of patients upon whom an operation has been performed for the removal of sarcoma. (3) The publication of all cases whether the result was favorable or otherwise, in order to enable surgeons to collect reliable and trustworthy data for future study. (4) The importance of a microscopical examination of every sarcoma. Surgeons are of one opinion upon this point, that a microscopical examination is a *sine qua non* to insure the tabulation of a case for purposes of study. (5) The importance of a radical operation in these cases of malignant sarcomata affecting the long bones of the extremi-

ties, and the condemnation of partial enucleations and the use of caustics and plasters. (6) The importance of encouragement to patients suffering from malignant disease of the long bones, on the ground that early and radical operations, even in the most malignant cases, may result in perfect cure.—*Med. News*, Jan. 14, 1888.

III. Cases of Wladimiroff-Mikulicz Osteoplastic Resection of Foot. By STEPHEN SMITH, M. D., and CHARLES MCBURNEY, M. D. (New York), and Sir WILLIAM MACCORMAC (London). A man, æt. 21, suffering from the effects of a crushing railway injury to the heel of the right foot, was subjected to this operation. The wound progressed admirably and the prospects for an excellent result were good, when the patient disappeared from the hospital and had the foot amputated elsewhere.—*Medical News*, March 17, 1888.

Dr. McBurney's case occurred in a man who had sustained a compound comminuted fracture of the os calcis with extensive laceration of the tissues. The os calcis and the astragalus were removed and the cuboid and scaphoid and the lower ends of the tibia and fibula sawn off and the bones nailed together. Retarded by a bone abscess, which it was necessary to scrape out, the patient made a good recovery.—*N. Y. Med. Jour.*, March 3, 1888.

Sir William MacCormac's case was as far as his knowledge extended, the first in Great Britain. A boy, æt. 15, suffered from disease of the joint between the os calcis and the astragalus, and beginning in the ankle joint with extensive suppuration and extensive breaking down of the tissues, all consecutive to a sprain of the left ankle. The parts involved were resected, the foot brought into a straight line with the leg, and the cut surfaces of bone sutured together with kangaroo tendon. Rapid recovery and an excellent result ensued, the left limb being half an inch shorter than the other.—*Lancet*, May 5, 1888.

IV. Reduction of Dislocated Sternal Bones by a Cough. By C. B. PORTER, M. D. (Boston, Mass.), and C. B. LYMAN, M. D. (Denver, Col.). Porter's case was a football player, æt. 21, whose sternum was separated at the junction of the second and third pieces of

the gladiolus by direct violence. Reduction of the fragments could not be obtained without direct operative measures, until on the third day while coughing the bone suddenly snapped forward into place, from which time he made a rapid and complete recovery.

Lyman's case was a brakeman who suffered a dislocation of the gladiolus behind the manubrium from a fall upon his chest. While the surgeon was manipulating the fragments in his endeavor to reduce them, the patient gave a slight cough which caused prompt reduction. —*Boston Med. and Surg. Jour.*, April 12, 1888.

JAMES E. PILCHER (U.S. Army.)

V. On Old, Badly Healed Fractures of the Patella. By P. BRUNS (Tuebingen). The doctor opposes the opinion, prevalent in most text-books, that the length of the fibrous bands uniting the fragments stands in direct proportion to the functional disturbance of the part. The latter is known to be, occasionally, more severe when the band is short than when it is very long. The author in this connection recapitulates from literature the cases in which the fragments were separated from 10 to 20 cm. with good functional powers. This fact, in connection with the observations that fractures of the femur with shortening and rupture of the quadriceps muscle and of the ligamentum patellæ, never lead to an impairment of muscular power, also demonstrate that in so-called "badly healed fractures of the patella," the cause of functional disturbance must be looked for in another direction. In these cases the muscular power regulates itself according to the new anatomical conditions imposed; the muscular fibres contract and shorten, and the lengthened, or, as it were, the relatively lengthened muscle regains its former tension in the state of contraction. How, then, must those cases be explained in which, with little separation of the fragments, stiffness in the joint, insufficient extension and unsteady gait supervene? Some authors (Malgaigne) have sought an explanation for this in the atrophy and consecutive insufficiency of the muscle, as already stated. It is quite true that during the treatment, caused by inactivity, atrophy of the muscles, especially of the extensor muscles, is always observed, but this disappears again

as soon as the movements of the limb are resumed, and only remains permanent when anatomical and mechanical hindrances are present. Bruns finds two other causes for the bad results in such cases. Either fibrous union has failed to occur at all, or the upper fragment has become attached to the femur. In three cases in the author's experience these conditions have prevailed, and in two of these operative interference restored the normal function of the limb. Of these two conditions a failure to unite is the most frequent, and in such cases the separation of the fragments must not necessarily be very large: on the other hand, a separation of over 4 cm. is not, as Adams has asserted, invariably followed by non-formation of an intermediate fibrous band. The latter, Bruns thinks, is the result of an unfavorable position of the fragments (tilting), or the interposition of parts of the fibrous expansion of the quadriceps, enveloping the patella. Another cause is refracture of the patella in the fibrous band, which does not again unite. Occasionally in these cases the action of the quadriceps is extended to the tibia by the fascia lata, the ligaments at the sides of the joint, or by bands running from the external and internal vastus to the lower fragments. Regarding the union of the upper fragment to the femur, the author found it to depend in his case upon the interposition of parts of the fibrous investment of the patella, which covered the fracture surface of the upper fragment and became adherent to the adjacent parts of the capsule of the knee-joint.—*Beitrage zur klinischen Chirurgie Mittheilungen aus der Chirurg. Klinik zur Tuebingen.* Bd. iii., hft 2.

VI. Treatment of Fracture of the Patella and its Results.

By DR. ERNST BECK (Tuebingen.) On the basis of 28 cases at the Tuebingen clinic, the author discusses the question, whether the suture of the patella after Lister, or the bloodless methods with retentive dressings simply, ought to be practiced in general, a question which has lately been answered in different ways. At the outset he considers the well-known data regarding the causation of these fractures, the preponderance of the male sex, the great frequency of transverse fracture and the usual separation of the fragments of several inches. In three

of his cases no fluid could be detected in the knee-joint. The treatment adopted was manifold. Retentive dressings, Malgaigne's hooks, puncturing of the knee-joint, and suture of the patella. The treatment with retentive dressings was adopted in cases of slight separation of the fragments (5.) Malgaigne's hooks were employed in seven cases; three of these occurring in pre-antiseptic times and all of them suppurating; the remaining four progressed without any inflammatory reaction and with excellent final result. Four cases were treated with Bruns' screws (an apparatus consisting of two screws, one of which is driven into each fragment and then approximated to the other.) Of these eleven cases the function of the limb was entirely restored in seven, in one of which bony union resulted; the result in three cases could not be ascertained. The four cases treated by puncturing of the joint were not very successful; twice it became necessary to incise the joint, as the blood within had already coagulated, and in the other two it was impossible to approximate the fragments, although the joint had been emptied. Blood can coagulate in the joint within the first twenty-four hours, generally it remains liquid until the third or fourth day after the injury. Kocher's peri-patellar suture was used in one case (trauma of four weeks standing, separation 1 cm., fragments very movable.) The result was very satisfactory (2 years after the operation.) The operation is performed as follows: two small longitudinal incisions are made at the ends of the fragments, and into one of them a needle, armed with a double sea-grass suture, is introduced, carried along the under surface of the patella, and brought out at the other incision: the suture is then firmly tied. B's result is the more notable, as Kocher himself has not had very good results with his own method. Suture of the patella, with free incision of the joint, was practiced five times, three times in recent cases, all resulting in osseous union; of the remaining two we receive no particulars. Beck concludes from his three cases, added to the forty-five cases of suture recently published by Brunner in the *Deutsche Zeitschrift für Chirurgie*, vol xxiii, as compared with his cases of bloodless treatment, that the latter is the only rational one and ought always to be adopted, if the knee-joint is not opened by the injury.—*Beitrage zur klinischen Chirurgie Mittheilungen aus der Chirurg. Klinik zu Tuebingen*, bd. iii, hft. 2.

VII. On Free Bodies in the Elbow-joint. By Prof. KOENIG, (Goettingen). In three cases of this affection the patients were aged 16, 20, 15 years respectively. They were not suffering from any general disease of the joints. Beyond a local thickening of the joint capsule no disease or arthritis deformans was present. The disturbance of function consisted in a limitation of extension. In two cases the foreign bodies could be demonstrated before operation. The bodies are found frequently in the anterior pocket of the joint on the ulnar or radial side. The symptoms which indicate joint-body are sudden pain and synovitis, painful mobility, and affection of complete extension after the disappearance of acute symptoms. In each attack the anterior aspect of the joint (elbow) is painful. Koenig prefers, in the majority of cases, to open the joint for the removal of the bodies by a longitudinal incision, 8-10 cm. to the right or left of the biceps tendon. The author contends that force may at times be exerted sufficient to cause the separation of pieces of tissue from the surface of articular ends of bones. These pieces, however, in healthy joints rarely become free bodies. The force necessary to cause such disturbance must be very great. In the elbow or knee a trauma may, by injuring the integrity of some part of the superficies of the articular extremity of the bones, cause necrotic changes, with subsequent separation of pieces of tissue which become free bodies in the joint. It must also be accepted that there is a spontaneous osteochondritis dessicans which without any special trauma may cause the separation of parts of the surface of the ends of the bones. A great many of the so-called traumatic cases must come under this category. The etiology of this pathological change is still obscure.—*Deutsche Zeitschf. Chir.*, bd. xxvii, heft 1 and 2.

HENRY KOPLIK (New York).

ON FORMING A NEW ACETABULUM IN CERTAIN RESECTIONS OF THE HIP JOINT.

By ALEXANDER OGSTON, C. M.,

OF ABERDEEN.

REGIUS PROFESSOR OF SURGERY AT THE UNIVERSITY OF ABERDEEN.

THE operative cure of Congenital Dislocation of the Hip Joint, was, I believe, first introduced into practice in 1884, by Dr. F. Margary of Turin, [*Archivio di Ortopedia*, Vol. I, page 381.] I have had occasion to carry out his operation three times, viz., on the 12th of August, 1885, on both hip joints of a young man in the Aberdeen Royal Infirmary, and on the left hip joint of another young man in the same institution on the 8th of October, 1887.

In all these three there existed the usual very marked flexion of the femur on the pelvis, causing, when in the upright position, the unseemly projection of the sacrum behind, resembling the seat of a chair, with shortening and a waddling gait. In all three the result of the operation was so far satisfactory. The position of the pelvis was rectified by the operation, and its ungainly projection backwards no longer existed when the legs were put straight down. On the left leg of the former patient the cure was rapid, and resulted in a firm movable new joint on which he could stand and walk well, but in his right hip uneasiness and weakness remained for many months, although they eventually disappeared, and when I last saw him, a year ago, he was in a condition of marked improvement as compared with his original state. On the second patient (left hip) the same uneasiness was complained of, and still remained when last he called to show his joint. In both these weak joints the upper end of the femur stood decidedly away from the pelvis, and when the knee was moved described an arc of a small circle in the inverse direction, as if the bond of union with the pelvis on which the motions centred were an inch or so below it. In the left hip of the former patient where the

result was so satisfactory the upper end of the femur did not stand out from the os innominatum in the same way, but lay close to it and was the centre of the movements of the new joint.

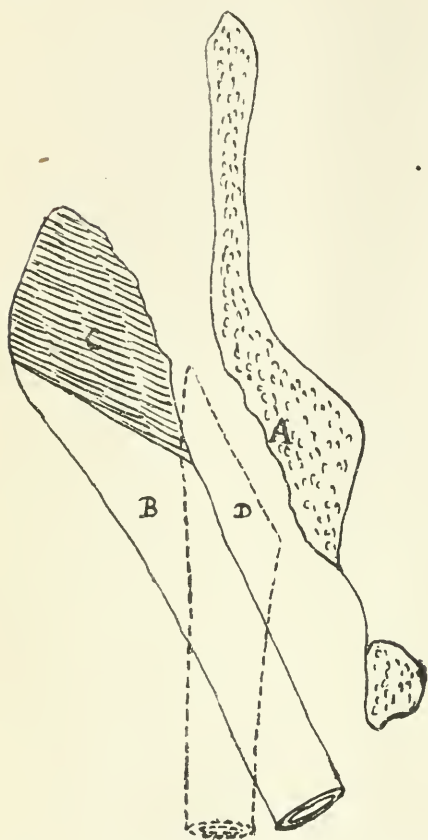


FIG. 1. DIAGRAM ILLUSTRATING THE OPERATION WITHOUT FORMATION OF A NEW ACETABULUM.

- A. The obliterated acetabulum.
- B. The femur, head and neck absent, in its adducted and flexed position.
- C. The portion removed at the operation.
- D. The femur as placed in position after the operation.

The reason of the weakness seemed to me to be the following: 'During all three operations it was observed that the acetabulum had entirely disappeared, its place being occupied by irregular bone (see Fig. 1, A,) and that the caput and cervix had likewise disappeared, a rough surface on the inner aspect of the trochanter major having replaced them (see Fig. 1, B.) The upper end of the femur was therefore sawn obliquely off (see Fig. 1, C,) so as to leave a bevelled surface which, when placed against the site of the acetabulum, would, it was hoped, become united to it by fibrous tissue. The patients were therefore treated by extension by a weight at the foot sufficient to keep the femur in the desired place (see Fig. 1, D.) In only one of the three instances did this design seem to have been successful; although all healed

by first intention and had an aseptic feverless course.

The idea of making a new acetabulum to retain the upper end of the femur was formed on the experience gained in these three operations.

In the meantime the result of another case strengthened the belief that such a plan would be advantageous. This was a spontaneous dislocation, the result of bygone non-suppurative inflammation. Mr. Wm. Adams had in the *British Medical Journal* of 1st November, 1884, page 860, published a case of spontaneous dislocation of the femur treated by resection of the caput. Following his example, I treated this case, which occurred in a female child in the Aberdeen Infirmary, by a resection of the head, on the 20th November, 1886. So far as healing went, the result was perfect, and the functional result of the operation was a very good one; but it seemed to leave something still obtainable. The union was firm, and the patient walked well, but the bones did not bear on one another so closely as I thought they might have done.

When, therefore, another case of spontaneous dislocation, also in a female child and the result apparently of a bygone acute non-suppurative arthritis, presented itself at the Infirmary for treatment, it was decided to endeavor to make a new acetabulum, and to shape the femur so that it would fit into it.

Several things pointed to such an attempt being feasible, while it was evident that the plans of Margary and Adams were not quite satisfactory. Küster and Israels [*Verhandlungen der Deutschen Gesellschaft für Chirurgie* vol. 12, pages 118 and 120] had drawn attention to the formation of a new caput femoris in resections of the hip joint. Volkman's recommendation to cut the upper end of the femur transversely through so as to leave a projecting point like a coronoid process in the neighborhood of the lesser trochanter, although a great improvement in ordinary resections on the older form of resection of the caput alone, where the bone slides past the acetabulum, blocks the wound and leads to retention of wound secretion, would be of little use in congenital or spontaneous dislocation where the acetabulum is totally obliterated, as I had found it to be at the operation of the 20th November, 1886. Further I was, and still am satisfied, from repeated trials that

Volkman's method of after treatment in the abducted position of the lower extremity, whereby he hoped to direct the femur

towards, instead of past the acetabulum, and utilize the contraction of the soft parts to press the bone into the acetabulum instead of upwards behind it, is a mistake. It is almost impossible to carry it out, as the discomfort which it causes leads the patient to alter the position of his pelvis and sound extremity which we cannot properly fix, and so avoid the irksome direction of the diseased limb. In a word, it seems to me to possess no advantage and many disadvantages.

In deciding to cut a new acetabulum and shape the femur so as to fit it my idea was to make a V shaped notch in the os innominatum in the situation of the acetabulum (see Fig. 2 A.) and cut the upper end of the femur in Volkmann's fashion so that it would easily and naturally lodge in it (see Fig. 2, B.)

But when the child was put under chloroform and the parts exposed, on the 11th January, 1888, it was found that this could not well be done. The usual incision upwards and backwards from the middle of the great trochanter towards the posterior superior spine of the ilium (Langenbeck's incision,) gave free access to the head of

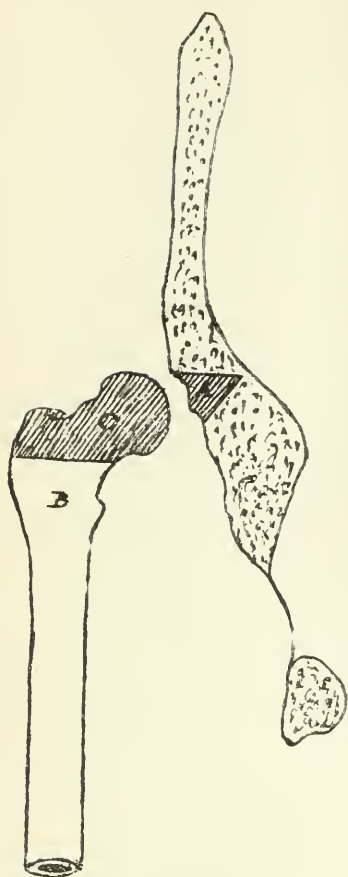


FIG. 2. THE OPERATION OF FORMING A NEW ACETABULUM AS PLANNED.

- A. Notch to be cut in os innominatum.
 - B. Femur shaped to fit the notch according to Volkmann's method of resection by removal of the head and part of the neck and trochanter.
 - C. Part to be sawn off.
- ilium (Langenbeck's incision,)

the bone, and allowed its being sawn off according to Volkman's plan, leaving the usual projecting point. But when the outer surface of the os innominatum was examined (no hollow or trace of an acetabulum was found) it appeared clear that the projecting point of the femur could not be trusted to remain in a mere notch, as the least movement would have slipped it out of it. Moreover, the state of the parts rendered it probable that, had it remained firm in the notch, bony ankylosis would have occurred, and to the patient this would have been a loss instead of a gain in whatsoever position the bones joined.

But it appeared not at all unlikely, from the known tendency of perforations in the os innominatum to be filled up with fibrous tissue instead of bone, that if a hole were made right through the bone, the point of the femur, when lodged in this opening, would readily be retained in it if the aperture were sufficiently large, and would, aided by passive movement during the after treatment heal into it by fibrous union, so as to leave a movable joint and a firm articulation where bone would bear on bone.

Accordingly a gouge was entered on the outer surface of the os innominatum, just above where the acetabulum should have been. It was thought better to do so there than at the site of the acetabulum, so as to avoid undue tension. The bone was easily pierced by the repeated removal of small portions. The opening was enlarged around its edges by the gouge until it was big enough easily to admit the point of the thumb. The projecting point of the femur was readily placed in it (see Fig. 3,) and was found to remain there even on moderate flexion and extension.

The wound was closed by continuous buried sutures of catgut that united the soft parts to each other layer by layer and muscle to muscle until the skin was last of all also united throughout by the continuous catgut suture. No drainage was used. Listerism was employed throughout, and the dressings were of Lister's carbolized gauze. No extension was applied, but the parts were kept immovably in position by a Plaster of Paris bandage that included the pelvis and both

hips. This, along with the dressings, was removed in three

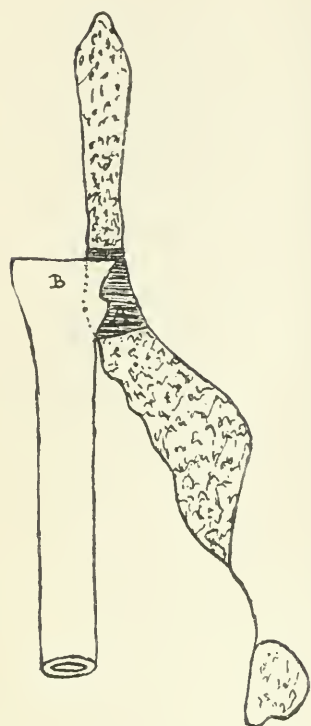


FIG. 3. THE OPERATION OF FORMING
A NEW ACETABULUM AS CARRIED
OUT.

- A. Perforation of ilium.
- B. Femur placed in it.

weeks, when the wound was found healed per primam. The child's temperature never rose.

In a word the result was good. The child had no pain, even on passive movement, and in seven weeks was walking about with a movable hip joint. The bones seemed to bear on each other. The femur lay quite close to the pelvis and could not be pushed in any direction or to any degree out of its position. The deforming flexion and adduction at the hip joint had quite disappeared.

In aseptic operations, as for congenital or spontaneous dislocations, such a new articulation may with safety be made; but in resection for ordinary (tubercular) morbus coxæ, the danger of tubercular auto-inoculation of the textures within the pelvis would be, I believe, far too great to justify its being attempted.

THE TREATMENT OF URETHRAL STRICTURE BY WHEELHOUSE'S METHOD.

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TO gain access to a bladder, by means of a perineal section, when a stricture of the urethra exists, impassable to any variety of catheter or guide, is an operation which a distinguished surgeon of a former generation thought should be commenced very early in the morning of a long summer's day. Without doubt the attempt to lay bare the contracted portion of the urethra, of penetrating it, dividing the constriction and relieving the bladder has often proved wearisome, and not infrequently has ended in surgical failure.

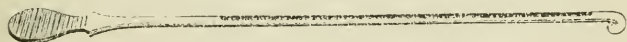


FIG. 1.—WHEELHOUSE'S STAFF.

In the *British Medical Journal* for June 24th, 1876, Mr. Wheelhouse, of Leeds, advocated a method which has proved so useful that it is known in England as "Wheelhouse's Operation."

The principle of the proceeding is to lay open the urethra from the perineum *above* the stricture; to pass an ordinary silver probe, or a probe pointed director through the constriction into the bladder, thus securing a guide for the thorough division of the stricture with a bistoury, and subsequently for the passage of a full sized catheter into the bladder. To attain this most satisfactorily a specially designed straight steel staff (fig. 1) is employed. This instrument is 12 inches long, terminating in a button like end and grooved on its under surface

for 6 inches; the groove finishes half an inch above the button.

The staff having been inserted into the urethra as far as it will go, that is, down to the stricture, care being exercised that it is not forced into a false passage, the perineum is incised in the middle line, from a point just above the knob on the staff to the outer edge of the anal sphincter, and a dissection is made in the middle line down to the urethra. The normal canal is then opened at the point where the groove in the staff ends, and its edges secured by two pairs of acupressure forceps, that is one on each side. The staff is then turned round and slightly withdrawn, so that the urethra is gently hooked upwards. (Fig. 2.)

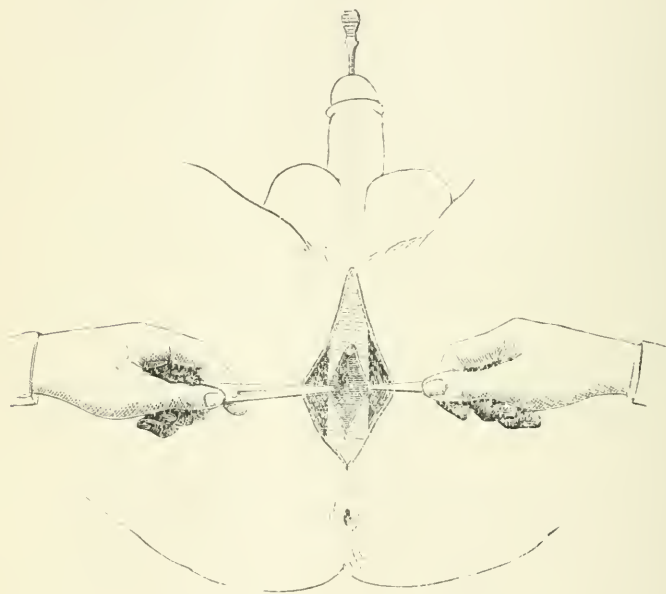


FIG. 2.—WHEELHOUSE'S OPERATION.

The entrance to the stricture now lies immediately below the portion of the canal that has been opened. An ordinary silver probe, or a probe pointed director, is carefully insinuated, generally with some difficulty, through the stricture into the

bladder. Personally it has been found more advantageous to employ a small silver probe, as it is more easily coaxed through the stricture. When this has reached the bladder, by its side is passed a flat director (Fig. 3) and the probe is with-

FIG. 3.—THE FLAT DIRECTOR.

drawn. Whichever instrument be employed, when the director has certainly entered the bladder, it is turned with its groove downward toward the anus, and the whole length of the stricture is divided with a probe pointed bistoury. This having been accomplished, Mr. Wheelhouse advocates the introduction of a probe-pointed gorget from the perineum into the bladder, and a full sized catheter is passed from the meatus and readily guided along this into the interior of the organ. If a flat director, such as is depicted, be employed the gorget may be dispensed with, for when the stricture has been thoroughly divided no difficulty will be experienced in guiding a silver catheter along its groove into the bladder. I usually employ a No. 10 (English) which is fastened in and allowed to remain *in situ* for four days. Should the stricture be a very long one, and difficulty experienced in passing a probe through its entire length, the division should be effected piecemeal until the whole of the constricted channel has been laid open. The newly made wound is then carefully cleansed with a weak carbolic or a saturated solution of boracic acid lotion, all visible bleeding points secured, and a double fold of lint, which has been soaked in boracic acid and glycerine (1 in 4), applied. Over this a wood wool pad, or a flat sponge, and the whole securely fixed to the perineum by means of a T-bandage. The administration of a one-half grain morphia suppository completes the operation. When the patient has been placed in bed, the urine can either be drawn off at an interval of two or three hours by removing the stylet from the catheter, or else the bladder may be kept constantly drained by the aid of a long piece of elastic tubing conveying the water to a

vessel placed beneath the bed. The subsequent treatment consists in irrigation of the perineal wound twice daily with a saturated solution of boracic acid, the free use of iodoform powder, and a dressing of boracic glycerine. It has been found better to avoid carbolic acid preparations, as they are apt to cause irritation and even sloughing of the skin of the scrotum. The catheter is to be removed on the fourth day, and as the perineal wound rapidly contracts, it is practically healed by the fourth week.

Four days after the withdrawal of the catheter, a full sized instrument, No. 11 or 12 (English) is passed into the bladder from the meatus, and this is repeated twice weekly until the patient is ready to leave the hospital. Before actually doing so a No. 14 (English) bougie is passed, and instruction is given to the patient, in order that he himself may be able to insert a No 10 at least once weekly.

Very often in these long standing urethral strictures the surgeon has to contend with pathological changes in the bladder, ureter or kidney pelvis. A rise of temperature, even up to 102° F., after the operation must not, therefore, be wondered at: the presence of the catheter acts doubtless as an excitant. Should temperature remain persistently high, it is my custom to withdraw the catheter on the third day. At one time large doses of quinine were administered to counteract the hyperpyrexia; now I am content with the free exhibition of bland liquids, such as soda water and milk, barley water, etc., so that the bladder is kept well flushed. If the urine be very fetid, the bladder is additionally washed out once or twice a day through the catheter, with a warm saturated solution of boracic acid, until the time arrives for the withdrawal of the instrument; till then a milk diet is rigorously enforced.

COMPLICATIONS SUBSEQUENT TO OPERATION.

The following have been met with :

I. Secondary Hæmorrhage.

This has happened on five occasions in a series of 37 cases; all occurred within 24 hours of the completion of the opera-

tion. In every instance the stricture was long and dense, extending to the bulbous portion of the urethra. At the time of the operation a free general ooze may be looked for, especially when the stricture is of long standing, but, as a rule, the pressure exerted by a flat sponge and a T-bandage is sufficient to prevent excessive after-bleeding. With every patient, however, care must be exercised by the operator to secure all visible bleeding points and not to apply a dressing until staunching is complete. Should secondary hæmorrhage occur, the wound is best plugged by long strips of dry lint, after it has been satisfactorily demonstrated that no distinct arteriole is unsecured.

II. Rigors.

One or more were frequently met with during the after-treatment of these cases, but not in any of the patients in whom an unopened abscess existed at the time of operation. A shivering fit, more or less intense, was common at the first micturition after withdrawal of the catheter, this being attributable to the urine, probably ammoniacal, coming into contact with the newly made wound. In such instances temperature was only temporarily elevated, and the occurrence appeared to be most constant in neurotic subjects. A 10 grain dose of quinine, administered before the first micturition, did not appear to exert any beneficial influence.

III. Fistula at the Root of Penis.

This was noted on one occasion, the patient being a man, æt. 44, rather cachetic, and with a dense stricture, commencing in the spongy portion of the urethra, just below the point of junction of the penis and scrotum, and extending to the neighborhood of the bulb. It appeared on the third day after the operation, and was doubtless due to the pressure of the silver catheter. The patient left the hospital at the earliest possible date, with the opening nearly closed, but after resuming his every day occupation, healing was arrested, and at the end of four months he had to return to the hospital, in order that further operative measures might be resorted to for closing the small opening.

IV. Perforation of Bladder by the Catheter.

This patient was a man, æt. 42, with a history of long standing stricture and several fistulous openings in the perineum, through which the major portion of the urine was voided. The operation was performed on July 14, 1885, and death occurred on July 22. The extract from the hospital pathologist's record, regarding the condition of the urinary organs, is as follows: "*Kidneys.* Capsules thickened and adherent, with granular underlying surface. Cortex very narrow; one subcapsular abscess. No pyelitis. *Ureters* not dilated. *Bladder* contracted and empty; surface of mucous membrane deeply congested and red with submucous hæmorrhage and slight ulceration. At the junction of base and posterior surface, nearly in the middle line, but slightly inclined to the right, was an opening leading into a sacculus as large as the end of the thumb, and at the top of this an ulcer, the size of a three penny piece, perforating the coats of the bladder and leading by an oblique passage directly into the peritoneal cavity. Its edges were pale and sloughy and its opening into the peritoneum surrounded by yellow lymph. There was general purulent peritonitis, most intense in the pelvis, and the coils of intestine were glued to each other by lymph; one coil was adherent to the bladder. In the cavity of the pelvis were two ounces of purulent fluid."

From the standpoint of a practical surgeon this case must be regarded as unusually exceptional.

Cases.

Taking the record of hospital practice for 10 years, 37 patients have been subjected to operation by Wheelhouse's operation. Their ages varied from 25 to 74.

Perineal fistulæ existed in 12, unopened perineal abscess in 4, extravasation of urine in 4.

The deaths were seven in number. Three fatalities occurred in cases in which extravasation had preceded operation; two were from septicemia, the third from exhaustion. Their respective ages were 67 (18 days after operation); 36 (9 days after operation); 28 (second day after operation).

In the fourth case death took place on the tenth day from pyemia, the patient being 74 years of age. The right knee-joint contained sero-purulent fluid. The prostate was enlarged. The bladder, in a state of chronic cystitis, was hypertrophied and sacculated. The ureters were dilated. Both kidneys were cirrhotic.

The fifth death was due to peritonitis following perforation of the bladder (details recorded previously).

In two instances no post mortem examination could be obtained. One died, æt. 33, of chronic septicemia ten weeks after the operation; the other, æt. 41, on the second day.

Recurrence of Contraction After Operation.

This in a great measure will depend upon the patient. With very little care a stricture may be kept well dilated for a long term of years, and, for ought I know to the contrary, for a life time.

When no precautions are adopted, I am satisfied that narrowing of the urethra takes place much more slowly after a free external division than after any other means of treatment. Personally, in one case only, have I been obliged to resort to perineal section a second time. The patient, J. N., æt. 44, had Wheelhouse's operation performed in the early part of 1883, for a very dense stricture, complicated with perineal fistulæ. When he left the hospital, No. 12 (English) bougie readily entered the bladder. Almost immediately he emigrated to the United States of America, lost his metal bougie on board ship, and noted two years later that his stream of urine was assuming smaller dimensions. Three years after operation he sought surgical relief, but no catheter could then be passed into the bladder. He returned to England and re-entered the General Hospital at the end of October, 1886. It was then found that the perineum was much indurated, that the urine was mainly voided through four fistulous openings, and that no catheter could be passed into the bladder. The urine was highly albuminous, and the patient's complexion pale and pasty.

It was necessary to bisect the scrotum and to lay bare the

dense fibrous structure, corresponding to the spongy portion of the urethra, from the root of the penis to the bulb. At the end of November he left the hospital with the wound closed, but with no restoration of the channel, all the urine being voided at will, but after the manner of a woman, through a well established fistula, admitting a No. 12 bougie, immediately in front of the triangular ligament.

Cases Suitable for Operation.

When the stricture is so dense as to be practically impassable, whether the result of gleet or traumatism, perineal fistulæ or abscess are frequent complications. In such instances perineal section, in some form, is imperative. As a matter of every day practice, external urethrotomy should not be limited merely to the wholly impassable class. The social status of the patient should be taken into the surgeon's consideration. Amongst the better educated a stricture is well known to have its dangerous side; hence it is seldom permitted to attain perfect impassability. Amongst those who have to be dealt with in hospital practice, a knowledge of things surgical, or it may be, lack of opportunity, is not so frequently met with; hence among such are found the victims of the worst type of urethral stricture. I am satisfied that in those cases admitting only the smallest filiform bougie, Wheelhouse's operation is, in the long run, the speediest and most effectual method of maintaining the patency of the genito-urinary canal.

The merits of the plan advocated by Mr. Wheelhouse may be summed up as follows:

1. It lays down precise rules which, if systematically followed, convert an exceedingly tedious, often a very difficult operation into a comparatively easy procedure.
2. It insures a thorough and visible division of the strictured portion of the urethra from before backwards.
3. With little subsequent, but readily applied, treatment by the patient himself, it affords permanent relief as far as the flow of urine from the bladder is concerned.

CASE OF SUPRACORACOID DISLOCATION OF THE SHOULDER.

By A. W. MAYO ROBSON, .F.R.C.S.

OF LEEDS.

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FRIDAY, December 23, the patient a strong, healthy youth, *æt.* 16 years, was putting on his coat, and having got his right arm into the sleeve was commencing to introduce the left, when the loose sleeve was caught by the "breast stop" of the machinery and quickly twisted round, the right arm being pulled violently in an upward and backward direction, away from the body. A sudden pain was felt in the shoulder at the time, but afterwards the whole arm felt numb; although on touching it, or on his attempting to raise it, there was very acute pain. He was seen an hour after the accident by his own medical man who found the shoulder much swollen and painful. Dislocation was diagnosed, and under chloroform an attempt was made to reduce it, but without success. No crepitus was felt. The bruising and swelling gradually subsided, but at the end of three weeks there was still considerable deformity.

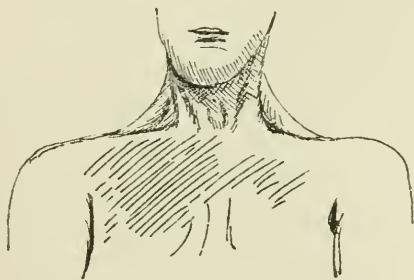


FIG. 1.—ANTERIOR ASPECT OF AFFECTED SHOULDER.

On admission to the Infirmary six weeks after the accident, there was a large, hard, slightly irregular, rounded swelling, about a finger's breadth in front of the right acromion and immediately to the outer

side of the coracoid process. On viewing the shoulder from the front a depression was seen immediately beneath the acromion, and again below this a rounded elevation, apparently due to the closer approximation of the fibres of the deltoid. The bony prominence moved with the shaft of the humerus in flexion, extension, adduction, abduction, circumduction, and rotation, so that there was no doubt of its being the *head* of the bone. The arm could be readily placed against the side of the chest with the hand touching the opposite shoulder. If the scapula was not fixed it moved with the arm, but if fixed, the arm could be moved from the side to an angle of $30'$. The tips of the fingers could be placed on the occiput. The arm could be moved anteriorly to an angle of $45'$, further movement being limited by the contact of the head of the bone with the acromion. In a backward direction the movement was not limited.



FIG. 2.—LATERAL ASPECT OF AFFECTED SHOULDER.

Rotation outwards was prevented by the head of the bone coming in contact with the acromion. The position of the clavicle and the coracoid process was normal. The supra and infraspinous fossæ were more flattened than on the left side.

Measurements: Circumference, taken by passing a tape under the axilla and over the shoulder was $14\frac{1}{2}$ inches, being equal on both sides.

	Right.	Left.
Acromion to int. condyle, - . - -	10 inches.	$11\frac{3}{8}$ inches.
Head of humerus to int. condyle, - - -	12 "	12 "

Feb. 2. The patient was fully anæsthetised by means of ether, and reduction was attempted; at first by manipulation, and then by extension downwards, and downwards and backwards; but although considerable force was used no good was effected; hence, with the concurrence of two of his colleagues who happened to be present

Mr. Robson exposed the joint by an incision of $4\frac{1}{2}$ inches on the outer side of the shoulder, the incision being convex anteriorly and extending quite down to the bone. It was then discovered that in addition to the dislocation of the head of the humerus there was a longitudinal fracture separating the greater tuberosity from the head and extending down the shaft for some distance beyond the line of incision. On rotating the arm crepitus could be obtained. Reduction could not be effected in consequence of the glenoid fossa being filled with callus and plastic material, thrown out around the fracture. The wound was closed with catgut sutures, and a drainage tube introduced. Salufer "fluo-silicate of soda" dressings were applied.

The tube was removed on the third day and the wound was quite healed on the ninth.

March 17. When seen as an out-patient, he had a good range of movement of the arm. He said that he was quite free from pain and was satisfied that his arm would be as useful as ever. He intended resuming work in a short time.

For the notes of the case I am indebted to my House Surgeon, Mr. Berkeley, G. A. Moynham, M.B. Lond., M.R.C.S. and for the photographs to my friend Mr. H. S. Walker, M.R.C.S., L.R.C.P., Lond.

REMARKS.—That supracoracoid dislocation of the humerus is extremely uncommon is proved by the fact of there being only three cases on record.

In the System of Surgery, by Mr. Holmes, brief mention is made of these cases (p.979, vol. I), one mentioned by Malgaigne, one recorded by Mr. Holmes, (*Med. Chir. Trans*; p. 447, vol. 41) and one by Sir Prescott Hewitt. In Mr. Holmes' and Sir Prescott Hewitt's cases the coracoid process was broken; in Malgaigne's the head of the bone rested on the coraco-acromial ligament.

Mr. Pick, in his work on Fractures and Dislocations (p. 371) remarks, "this rare form of dislocation of which, as far as I am aware, only three cases have been recorded, appears to be caused by direct violence applied in an upward direction, and according to Mr. Holmes, can only occur after fracture of the coracoid or acromion process, usually the former."

The case here recorded does not accord with these observa-

tions, since there was certainly neither fracture of the acromion nor coracoid process, nor did the accident appear to be due to direct violence.

That the deformity was really due to supracoracoid dislocation was proved by the dissection undertaken for the purpose of reduction.

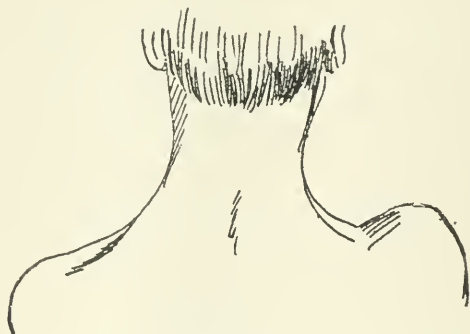


FIG. 3—POSTERIOR ASPECT OF AFFECTED SHOULDER

It is interesting to note that the circumference of the shoulder was equal on the two sides, and that the elbow could be made to touch the thorax while the fingers touched the opposite shoulder, since these two signs have been usually looked on as proof of absence of dislocation.

The peculiar fracture is worth noting, for the split was apparently incomplete below, so that although the tuberosity was separated by a fissure of a fourth of an inch, its other relations to the head of the humerus were not disturbed. The photographs taken in three postures serve to show more than any words can describe, and will, I trust, make clear any points left obscure in the notes.

A CASE OF FINAL REDUCTION OF DISLOCATION
OF INFERIOR MAXILLA LEFT UNREDUCED
FOR EIGHTY DAYS, WITH REMARKS.

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A FAIRLY healthy German woman, æt. 23 years, Lucy L—, according to the story related by herself, was attacked Nov. 10, 1887, with a severe illness which was probably endocarditis. At the end of a month she was apparently almost well, when December 10, while in a pleasant conversation with some friends, she was suddenly seized with an apoplectiform attack becoming entirely helpless, and, as her friends supposed, altogether unconscious. A physician was called who found her hemiplegic, and apparently comatose; advised the mother to get her to bed and to make her comfortable, and gave a decidedly unfavorable prognosis, saying the case was hopeless, that in all probability she would die, all of which the patient now says she heard distinctly understanding all that was said, as well as what was said by her mother and friends from the first moment of the attack, but that she was unable to utter a word—the aphasia was complete. After the physician had come and gone—after she had been put to bed—her mother thinks about an hour and a half from the moment of the attack, she was seized with gaping (of this the patient was also conscious and says she felt the jaw “snap”) and it was found that the jaw would not return, the mouth would not close, on account of which symptom the physician was again sent for; but he, evidently believing the jaw was dropped from paralysis, simply advised to bind up the chin with a handkerchief. The patient remained in this condition for several days. All, even her physicians, for another had in the meantime been called in and the two were attending together, were waiting for her to die. But little nourishment could be given as swallowing was difficult so that the food mostly ran out of her mouth. Finally the patient was able to make her attendants understand that she was conscious, and after a while by a system of pointing with the left hand to printed letters spelled out words indicating her wants.

Among the things she asked in this way was that her doctors would fix her jaw, but she received the same answer that her mother and brother had already received that they could do nothing, that nature would have to take its course¹. After this she was watched closely and carefully attended, and, by the aid of proper enemata, better nourished.

On the seventeenth day after the paralytic attack she was able, to the great joy to herself and friends, to articulate a word, and very soon another and another. And soon thereafter she was able to make herself understood as well as one with a disarticulated jaw could be expected to do. She says her frequently repeated request to her physicians was for something to be done to her mouth, but always received the same answer, "wait for nature." In other respects the medical treatment was evidently all that could be desired, and with the aid of galvanism massage, etc., she was slowly recovering from the paralysis.

In February of this year my friend, Dr. J. D. Wade, of this city, was called in, the family physician having himself been taken sick. Dr. Wade early recognized the dislocation and by his advice I was called in consultation.

On February 29, eighty days after the occurrence of the dislocation, with the assistance of Dr. Wade and of my son Dr. N. L. North, Jr., the patient being thoroughly anesthetized, I broke up the adhesions and reduced the dislocation. The reduction was not an easy matter. I tried the *usual* method, as did Dr. Wade and Dr. North, Jr., each of us doing his best, but we could make no impression upon the jaw. It was firmly adhered and fixed in its new position. Finally, with the patient profoundly under the influence of the anesthetic.² I took my position at the back, or rather at the head (the patient being supine) and with both my thumbs together made pressure downwards upon the right ramus changing the direction of the force applied slightly inwards, outwards and backwards as I increased the pressure. I soon had the satisfaction of feeling the adhesions giving way and the condyle loosen up. I repeated the operation upon the left ramus with the same result, after which I was enabled easily to reduce the dislocation with the pressure of a thumb on each

¹It is but just that I should say here that these were respectable physicians, each enjoying a large practice, one in Brooklyn, the other in New York.

²Chloroform one part, and ether two parts was used until the patient was well under anesthetic influence followed by ether alone to continue the effect, a plan I have followed for many years to my entire satisfaction.

ramus, and a lifting backward movement with the fingers of my hands as I closed them upon the jaw externally.

Partial luxations or subluxations of the inferior maxilla have but little interest for the surgeon, as they rarely reach him, the patient being usual competent to restore the bone to position without aid.

The symptoms of the complete double dislocation of the lower jaw, are a peculiar deformity, the mouth open, the chin elongated, the jaw pretty firmly fixed, the saliva dribbling over the chin, a depression in front of the meatus auditorius externus, the lower molar teeth striking the upper much in advance of their proper place and at an improper angle, and the incisors of the lower jaw separated from those of the upper by a decided interval of from half an inch to an inch and a half. Deglutition and speech are much impaired and difficult. In old or unreduced dislocations, these symptoms are partially overcome. The lips may have gradually become drawn over the teeth so that approximation is possible, and there may be some improvement in the movement of the jaw, and of swallowing and of speech, enough, perhaps, with superficial examination to make doubtful the diagnosis. In the unilateral or single dislocations the deformity is not as great and the jaw usually inclines to one side—that inclination, unlike a fracture of the bone is to the side opposite the dislocation. In fact the symptoms of maxillary dislocations are exactly what might be expected if we bear in mind the anatomy of the parts. And the fact that the only displacement probable¹ without fracture is the forward movement of the condyle with its articular cartilage into the zygomatic fossa, proportionately carrying the coronoid process forward and downward beneath the malar bone, being thence surrounded by the tendon of the temporal muscle.

The causes of these dislocations are various; violence, as of blows upon the chin when the mouth is opened; falls, dental operations; muscular action as of laughing, gaping or vomiting.

¹Ashhurst mentions that Dr. J. W. Hamilton, of Ohio, describes a spontaneous *backward* dislocation of the lower jaw.

Andrews mentions a case caused by a lobelia emetic. Sir Astley Cooper relates an instance in which this dislocation was caused by "thrusting a large apple into a child's mouth."

The case related above was caused by reflex muscular action resulting from an apoplectic seizure, probably of embolic origin as shown by the hemiplegia, aphasia and the other symptoms following. When the mouth is widely opened the condyles ride forward upon the articular eminences of the temporal bones and a comparatively slight amount of force from any cause while in that position may carry them still further and so lodge them in the zygomatic fossæ.

Andrews well says.¹ "The muscles of mastication, like those elsewhere in the body, when brought into extreme contraction sometimes become affected by a spasmodic shortening or "cramp" which the will is unable to control. The arrangement of muscles in the jaw is such that a powerful contraction at full extension tends to force the heads of the bone forward, and may rupture the capsule. The internal pterygoid inserted near the angle upon its deep surface becomes a sort of fulcrum when the jaw is widely opened. The various depressor muscles at the symphysis act, therefore, upon the longer arm of a lever forcing the condyles with power against the anterior wall of the capsules, and tending to break through them. The external pterygoids assist directly in pulling the condyles forward.

All these muscles are affected by the motor branch of the fifth pair, and when from reflex or other impression they act simultaneously, their power is very great. The condyles, which in the extended position are poised somewhat upon the summits of the articular eminences, are, by the spasmodic action referred to, made to spring forward in front of these prominences, and are immediately drawn upward under the zygomatic arches by the temporal and masseter muscles. The interarticular cartilages still remain attached to the condyles in most cases."

Dislocation of the inferior maxilla is an accident of middle life, or rather of early adult life, and is rare at either extreme.

¹International Encyclopedia of Surgery, vol. iii, page 650.

It occurs more often in women than in men. The reduction of this dislocation is brought about by a pressure downwards and backwards upon the posterior molars or the rami of the jaw, dislodging the condyles and coronoid processes from their new position, followed by an upward and backward pressure upon the chin forcing the jaw into its normal position. In the latter movement the surgeon is usually assisted by muscular action, and it is needful that some care be taken, lest he be involuntarily bitten by the patient.

This operation may, in recent cases, be easily performed by the surgeon standing in front of the patient, having a few turns of a bandage about his thumbs, pressing therewith as far back upon the teeth or jaws as he can, directing the patient to open the mouth widely at the same time grasping the chin and jaw by closing his hands, and with a lifting, backward, leverage movement, the thumbs being the fulcrums, the work of reduction is accomplished. After the reduction the four-tailed bandage to support the chin and prevent a recurrence of the dislocation should be worn for from eight to ten days.

It is evidently true, as stated in most works on surgery, that dislocation of the jaw is of infrequent occurrence, and that its restoration to the normal position in recent cases is an operation easily performed, and yet a number of cases have been recorded in which the dislocation has been left unreduced for many days, weeks, and even months, and by imputation at least, it is evident that other cases have been left altogether without reduction¹. Ashhurst says² "Even if the dislocated jaw be unreduced the patient gradually acquires considerable use of the part. * * * Reduction in recent cases is easily accomplished and has even been effected (by Donovan) more than three months after the reception of the injury." Bryant says,³ "Mr. Morley reduced one after thirty-five days, Spät after fifty-eight, Demarquay after eighty-three, Donovan, one

¹In Parker's Cooper, page 362 it is said, "Cases are on record of individuals who lived many years in this pitiable condition."

²Principles and Practice of Surgery, page 281.

³Practice of Surgery American Edition, page 450.

after ninety-eight, Pollock after four months, and Golding Bird after eighteen weeks".

Erichsen¹ refers to the cases of Donovan and Pollock, and also to one of Stromeyer "replaced at the end of thirty-five days." And Andrews² refers to some of the same cases remarking that "dislocations of the jaw of long standing have in some instances been reduced." If it is possible, and from the cases referred to it would seem undeniable, for this dislocation to be overlooked, or from any cause to be left unreduced, it seems but just, in view of the fact that most of the works on surgery dismiss the subject with very brief mention that the matter be entered upon somewhat in detail. In the past, up to within a few decades, much difference of opinion has existed as to the plan of reduction most appropriate. In 1850 Nèlaton discussed the anatomy of the parts, with their abnormal condition during this luxation and the mode of procedure best adapted to reduce the dislocation, which was quoted by the *Dublin Journal* and recorded in *Braithwaites Retrospect*³ under the heading of a "New Process for the Reduction of the Jaw." A case is there spoken of where an eminent surgeon, "summoned on the instant had made many attempts at reduction without success, when two other surgeons having been called in tried several methods, and finally at two o'clock in the morning the patient being wearied out, was left with the luxation unreduced." Nèlaton, using the case to explain his new mode of reduction further said, "I proceeded to the reduction, for which I ordered the patient to open the mouth as much as possible. Whilst she executed this movement, I placed my two thumbs on the coronoid processes, and without even embracing the jaw without taking my other point of support, a simple pressure in a backward direction caused the condyles to return suddenly to their cavities; the reduction was complete and all the symptoms disappeared." The account adds, however, that others, even those who had seen Nèlaton operate in

¹Eighth American Edition, page 628.

²International Encyclopedia of Surgery, vol. iii, page 650.

³Part xxii, page 209.

this way were not equally successful with his method. Colles' method, recorded in *Braithwaite*¹, was to stand behind the patient. Using his own words in describing the case of a young lady who dislocated the jaw while yawning, he says: "Placing her head against my chest, I passed each thumb as far back on the corresponding side of the jaw as possible; by making a rotary motion from the wrist I found the bone to yield by now adding a motion of drawing the hand in towards the chest, the left side first, then the right slipped into their positions and she now could speak plainly."

A paper on "Maxillary Dislocation and its Reduction" by Dillon Kelley, Esq., is recorded in *Braithwaite*² for Jan. 1868 in which the present usual method is advised in these words. "To reduce it, therefore, place the balls of the thumbs covered with a handkerchief on the crown of the posterior molars, grasping the angles of the jaw externally with the fingers; then desire the patient to open the mouth, when the slightest pressure downwards during the act of opening it will be sufficient to disengage the necks of the condyles from the transverse roots of the zygomas, and will permit the temporals and masseters to at once reduce the dislocation by the reinduction of their normal action."

¹Part xxxii, page 133

²Part lvi, page 153.

SOME POINTS IN THE TECHNIQUE OF THE TREATMENT OF FRACTURE OF THE PATELLA BY SUTURE.

By A. R. JENKINS, M. D.,

OF HENDERSON, KY.

SINCE the true anatomico-pathological conditions that exist in fractura patellæ, and those that attend it as sequelæ have come to be understood through the labors of the surgical world in general, and by the practical explanations of König, Hutchinson, Volkmann, Macewen, and v. Bergmann in particular, the future seems to present for this lesion but one result, and that a *sine qua non*. This desideratum is a true osseous union, with no diastasis of the fragments, complete *restitutio ad integrum* in an anatomical and physiological sense. Now to achieve this result scientifically, and with certitude (where the fracture is transverse or oblique and complete and of sufficient magnitude to require any treatment but that of simple rest in extension) the lines of fracture must needs be inspected by means of section, and perhaps secured together by sutures, etc. Several varying methods have been employed in making this patellar section and several in its union by suture, and only these two points of the subject will be discussed here, in connection with a proposed technique that covers both of these heads, *i. e.*, inspection, and retention of fragments—a method by which the writer claims all can be achieved that was, by the old methods with the bonus of less danger.

The technique of the section for exposing the fracture, so far as the writer knows, has been of three kinds: Volkmann's transverse cut having a plane corresponding with the line of fracture of the distal fragment and of variable length; the bow section of Textor, Mackenzie and others, recommended also by Koenig; and the median longitudinal section of Billroth. The first and last methods have this uncontrovertible defect that by reason of the cutaneous wound lying parallel with and

above or crossing the patellar fissure, it offers a direct route for infection of the joint. We further postulate that the cutaneous and osseous tissues in which the sutures are laid, are often contused, stretched, swollen and devitalized in a high degree—at least in direct and in compound fractures this is true. Simple cutaneous suture suppuration also may here infect the joint; and possibly this cannot with certainty be prevented in this situation, owing to the peculiar anatomical character of the cutaneous covering—the skin over the patella being set with the openings of numerous hair, and sebaceous follicles which are large, and might be receptive to contagium—and the skin here like that of the scrotum can not perhaps be made definitely aseptic. It should be observed also that this skin is a *locus minoris resistentiæ* as is shown for instance by the fact that furuncles frequently appear here: it is also a point of election for phlegmonous inflammation of the skin, and bursa, for psoriasis vulgaris, etc. Now if this hypothesis is true, can it be wondered at that cutaneous suture suppuration should be the rule? Investigation of the most precise sort should certainly be made with this point in view as to the anatomy, and pathology of the pre-patellar tissues.

Other objections to these methods are they are bungling, the subcutaneous and superficial position of the patella hardly leaving room for these two tiers of stitches or for the ends of wire, pegs, etc. Again marked pressure in the middle and superior recesses of the joint, *i. e.* above the alar ligament, such as might come from a hæmarthron or from inflammation within, would have a tendency to cause fluids to be forced through the patellar fissure, and a more serious inflammation might then take place by retrograde infection. Again attention should be directed to the complex and possibly dangerous structures which these wounds traverse, *i. e.*, skin, subcutaneous connective tissue, bursa, prepatellar aponeurosis, bone, and blood, also the free blending of joint, and wound fluids. The bow cut of Koenig involves too much tissue, among other things, a part of the patellar vascular arch, and would favor hernia, and atrophy of the capsular ligament, etc. It would also interfere with early massage, and joint movement as would

the other methods. It has decided advantages however over the other two methods.

If one while sitting will place the foot in a chair, and let the knee fall into passive extension, it will be found that quite a handful of tissue can be grasped from off the patella. If it be further examined it will be seen that just here the skin and connective tissue is more loose and elastic than elsewhere on the leg. Its greatest stretch is median longitudinal with the patella, and can be about equally drawn above or below the patella. The length of stretch in most cases is about one inch measured on the skin from the transverse middle of the patella. Or if the skin be drawn up, and the patella shoved down, and then ink marked across its middle; when the skin is let go the mark will about represent the lower border of that bone. If the skin be drawn down the reverse will occur. From side to side the elasticity is about one half this. It will be noticed at the situation of the ink marks that the skin is quite different in character from that which covers the convexity of the patella, and the subcutaneous connective tissue is here slightly different both in the length and in the direction of its fibres.

The method proposed is simply to put the skin on the greatest stretch and to cut down on the fragments by a transverse incision—whether the skin be drawn up or down depending on the amount of separation of the upper fragment. Naturally the incision would be made above if there was much retraction; or if there be much contusion of tissue on or below the bone, the incision is made above in the sound tissue. Through either of these openings the fragments could be freed alternately, and inspected, then sawn, drilled or sutured as might be; or an hæmarthron or fluids could here be removed from the joint, the capsular ligament sewn, etc. An assistant in the meantime, keeps the skin stretched as necessary, either with fingers, retractors, or Muzeaux forceps. Of course the strictest antiseptic prophylaxis and treatment should attend throughout.

In cases of compound fracture of the patella, with much destruction or pulping of the skin it is suggested that the doubtful tissue be excised, and that the sound skin, be drawn over the fragments. Compensation for the resected skin could be ob-

tained by incising a large Y or an arc above or below the resection wound and far enough removed to be safe, the concavity of the arc or the fork of the Y, looking towards the wound or by a tenotomy of the tensor vaginae femoris muscle.

Furthermore, it can be said for this method that it would allow of the extra-articular methods of suture, as employed by Volkmann and Riedel, or the intra-articular fastening of Kocher. Either of these methods could be used after the toilet of the patella was complete; all that is then necessary after the skin is relaxed, and the parts *in statu quo ante* is to make a counter opening at the opposite end of the patella, and from these two openings the catgut or silver could be manipulated by an armed needle around or beneath the patella (subcutaneous or subpatellar.)

In laying the last stitches in closing the cutaneous wound as a refinement of technique wounding of the skin could be avoided by the continuous sunken catgut stitch, thus eliminating infection through the skin appendages.

The particular claims for the method are that it admits of an almost subcutaneous exploration and operation on the diastasis and in the joint, and that it may even progress like the ideal subcutaneous wound to healing. It involves normal and less suspicious tissues. It is consistent to true plastic surgery, and to the anatomy and physiology of the parts involved. By making a proper use of the elasticity of the skin in this situation, the wound in most cases need be but small for the field of inspection and operation owing to elasticity of the skin can be moved from one part to another without the necessity of essentially enlarging the original cut. In this it resembles the laparotomy technique of Lawson Tait, in so far that it is an endeavor to bring the entrance operation wound to the *minimum*.

EDITORIAL ARTICLES.

SENN ON THE DIAGNOSIS OF GASTRO-INTESTINAL PERFORATION BY THE RECTAL INSUFFLATION OF HYDROGEN GAS.

The fertile mind of Professor Senn is notable for the originality of its conceptions. Our readers have been favored during the last half year with an account of his remarkable work in the treatment of intestinal obstruction, as presented to the Ninth International Medical Congress a year ago. Dr. Senn has not been satisfied to rest content with the laurels won by his previous labors in abdominal surgery, but has continued his vivisection experiments into the diagnosis of intestinal perforation.¹

The fact that intestinal perforation can be treated by suture with success is now fully established. And it may also be considered as demonstrated that a traumatic perforation of any portion of the gastro-intestinal canal is inevitably fatal unless it be treated by suture.

The fact that a small number of cases are on record in which undoubted perforation of the gut recovered without other than expectant treatment can not be regarded as militating against the truth of this general rule, since they form so small a portion of the total that they may be ignored in the consideration of the subject.

In opposition to this condition may be placed simple perforating wounds of the abdominal parietes without lesion of the viscera, a condition amenable to simple closure of the external wound and comparatively innocuous.

But the great difficulty that presents itself to the surgeon in the ab-

¹Rectal Insufflation of Hydrogen Gas an Infallible Test in the Diagnosis of Visceral Injury of the Gastro-intestinal Canal in Penetrating Wounds of the Abdomen. By N. Senn, M. D., Ph. D. (Milwaukee, Wis.)—*Journal of the American Medical Association*, June 23 and 30, 1888.

sence of positive symptoms is the differential diagnosis between a simple penetrating wound and a penetrating wound complicated by injury of the gastro-intestinal canal. While the existence of serious intra-abdominal hæmorrhage can usually be readily recognized by well-marked physical signs and a complexus of symptoms which points to sudden diminution of intra-arterial pressure, and thus furnishes one of the positive indications for treatment by laparotomy, the well-known fact remains that a visceral injury of the stomach or intestines seldom gives rise to symptoms upon which the surgeon could rely in making a positive diagnosis.

In the treatment of penetrating wounds of the abdomen laparotomy is resorted to either for the purpose of (1) arresting dangerous hæmorrhage, or (2) the detection and treatment of a wound or wounds of its hollow viscera. The first indication is readily recognized, and the diagnosis not only justifies the operation, but imposes it as a stern duty upon the surgeon from which he should never shrink. The recognition of the second indication offers greater difficulties, and the uncertainty of diagnosis which surrounds such cases is used as a sufficient argument by many in opposing the adoption of timely and efficient surgical treatment, and is responsible for the loss of many lives which otherwise might have been saved. The uncertainty of diagnosis must remain in the way of a more general adoption of laparotomy in the treatment of penetrating wounds of the abdomen in the case of timid surgeons, and the same cause may lead to most unpleasant medico-legal complications in the practice of bolder and more aggressive operators. Clinical experience and statistics have demonstrated the importance of making a distinction between punctured and gunshot wounds in the abdomen, both in reference to diagnosis and treatment. It is well known that penetrating stab-wounds are less likely to be complicated by visceral injury than bullet wounds, consequently this class of injuries offers a more favorable prognosis and does not call so uniformly for treatment by abdominal section. That penetrating gunshot wounds of the abdomen do not always implicate the gastro-intestinal canal has been well demonstrated by experiment and clinical observation. During the last two years three cases of bullet wounds of

the abdomen came under the observation of Dr. Senn where no doubt could be entertained that penetration had taken place, and yet all the patients recovered without operation. In all three cases the bullet had taken an antero-posterior direction.

As in private practice the treatment of penetrating wounds of the abdomen usually involves great medico legal responsibilities, it becomes of the greatest importance to arrive at positive conclusions in reference to the character of the injury before the patient is subjected to the additional risks to life incident to an abdominal section. A death from acute inflammation of the peritoneum consecutive to an explorative section after an abdominal lesion in which no visceral complication was discovered, may involve the surgeon in the gravest consequences, since the fatal result may be attributed directly to the operation rather than to the original wound. If some infallible diagnostic test could be applied in cases of penetrating wounds of the abdomen, which would indicate to the surgeon the presence or absence of visceral lesions of the gastro-intestinal canal, the indication for aggressive treatment would become clear, and the medico-legal responsibility of the operator would be reduced to a minimum.

As neither the symptoms nor ordinary physical examination could offer satisfactory evidence of the condition of the viscera in case of a wound of this kind, Dr. Senn was induced to search for some reliable test which in such cases should prove that the penetrating bullet or instrument had injured the gastro-intestinal canal. It occurred to him that a wound in the stomach or intestine should be sought for in some such way as a plumber locates a leak in a gas pipe. The first object to be accomplished was to prove the permeability of the entire gastro-intestinal canal to inflation of air, and the next step was to find some innocuous gas which, when inflated, would escape from the intestinal wound into the peritoneal cavity, and from there through the external wound where its presence could be proved by some infallible test.

The literature of the permeability of the ileo-cæcal valve to rectal inflation of air or gas is quite abundant, and the conclusions reached by various authors are diametrically opposite. While the majority

positively assert that the valve is perfectly competent and effectually guards the ileum against the entrance of both fluids and gases forced into the rectum, a considerable minority insist that it is permeable only in exceptional cases, and only a few claim that its resistance can be overcome by a moderate degree of pressure. Experiments by Heschl, Bull, Cantani, Behrens, Debierre, Lucas, Dawson and Battey are quoted upon this point, and the twenty-third, twenty-fourth and twenty-fifth experiments related in his paper on Intestinal Obstruction.¹ These three experiments combined with clinical experience leave no further doubt that, practically, the ileo-cæcal valve is not permeable to fluids from below, and that for diagnostic and therapeutic uses it is unsafe and unjustifiable to attempt to force fluids beyond the ileo-cæcal valve.

It would be expected *a priori* that air and gases on account of their less weight and greater elasticity than water, could be forced along the intestinal canal with less force, and for that reason alone, if for no other, should be preferred to water in cases where it appears desirable to distend the intestines above the ileo-cæcal valve. The results obtained by experimental research in the past speak in favor of rectal inflation by air or gas in all cases where for diagnostic or therapeutic purposes it becomes necessary to dilate the entire or a portion of the gastro-intestinal canal.

By six experiments Dr. Senn showed that both in the human subject and in animals by a moderate degree of force, short of producing any injury of the tunics of the intestines, air can be forced along the entire alimentary tract, and that this procedure can be resorted to with perfect safety for diagnostic and therapeutic purposes in all cases where the tissues of the intestinal wall have not suffered too much loss of resistance from antecedent pathological changes. In these experiments the air was injected through the anus with an ordinary elastic syringe, the inflation being traceable by percussion and manipulation.

By eight experiments he demonstrated conclusively that it is more difficult to inflate the alimentary canal from above downwards than from below upwards, as in the living animal he succeeded only in one in-

¹ANNALS OF SURGERY, Vol. vii, p. 20, January, 1888.

stance in forcing hydrogen gas from mouth to anus, while in others a desufficient to rupture the peritoneal coat of the stomach only effected distention of the stomach and upper portion of the intestinal canal. It is evident that great distention of the stomach constitutes an important factor in causing or aggravating intestinal obstruction, as it effects compression which causes impermeability of the intestines, or aggravates conditions arising from an antecedent partial permeability by producing sharp flexions among the distended coils of the intestines. For diagnostic and surgical purposes the stomach can be readily inflated almost to any extent through a stomach tube, and when it becomes necessary to ascertain the presence of a visceral wound or perforation of this organ, this method of inflation may be resorted to with advantage.

Accurate experiments to determine the force required to render the ileo-cæcal valve incompetent had not previously been made, and recognizing the great importance of obtaining accurate information on this subject, Dr. Senn made three experiments on dogs and two on healthy young men. In all experiments air or hydrogen gas was used. The inflation was made with a rubber balloon. The pressure was estimated either with a mercury gauge, or with a manometer used by gas fitters and plumbers. The manometer or mercury gauge was connected by means of rubber tubing with the rectal tube on one side and the rubber balloon on the other. The rubber balloon in which the hydrogen gas was collected held 4 gallons, and numerous experiments showed that when the gas was forced through the opening of a stopcock, the lumen of which was about the size of a knitting needle, a compression equal to 200 lbs. (90 kilograms) would never register more than 3 lbs. (1.3 kilograms) of pressure.

In the living subject the escape of air or gas from the rectum was prevented by an assistant pressing the margins of the anus firmly against the rectal tube.

In a normal condition the ileo-cæcal valve in a healthy adult person was found to be overcome by rectal inflation under a pressure of $1\frac{1}{2}$ to $2\frac{1}{4}$ lbs. (.6 to 1.2 kilogram). This amount of pressure is not sufficient to injure the tunics of a healthy intestine, and in both instances

the subjects of the experiments complained but little of the immediate or remote effects of the experiment. As the result of numerous observations, it is shown that when the inflation is made slowly and continuously there is less danger of injuring the intestines than when the inflation is made rapidly, or without interruptions. Slow and gradual distention of the cæcum is best adapted to overcome the competency of the ileo-cæcal valve, by effecting diastasis of the margins of the valve. The rubber balloon holding from 2 to 4 gallons (10 to 20 litres) recommends itself as the most efficient and safest instrument for making rectal insufflation for therapeutic or diagnostic purposes.

The pressure necessary to rupture a healthy intestine was found to be greatly in excess of that required to force air through the ileo-cæcal valve, or even the whole length of the alimentary canal, as showned by a large number of experiments upon dogs and upon the human cadaver. It only requires from one-quarter of a pound to a pound and a half (.1 to .7 kilograms) of pressure to force air through the ileo-cæcal valve, and from half a pound to two pounds and a half (.2 to .7 kilograms) to force it from anus to mouth, while even the weakest portion of the gastro intestinal canal effectually resisted a distending force of from eight to ten pounds (3.6 to 4.5 kilograms). The experiments on the human cadaver, where the resisting power of the gastro-intestinal canal to diastolic force was greatly reduced by ante-mortem pathological changes, show that under such circumstances it would have been safe to resort to inflation, as the pressure required to rupture the colon, or small intestines exceeded that which has been found adequate to force air or gas beyond the ileo-cæcal valve, or even the entire length of the alimentary canal. When an intestine is distended to its utmost capacity slowly by inflation of air or gas, and the pressure is maintained uninterruptedly, rupture occurs at one of two points, either a longitudinal laceration of the peritoneal coat takes place on the convex surface of the bowel opposite the mesenteric attachment, or minute ruptures on the mesenteric side give rise to extravasation of air or gas between the two serous layers of the mesentery, in either case, if the pressure is increased, complete rupture takes place at the point where the laceration first commenced.

He also presents five experiments upon dogs, and eleven upon human beings in illustration of the distention of the gastro-intestinal canal by rectal insufflation of hydrogen gas. They furnish only so many more demonstrations of the permeability of the ileo cæcal valve and the entire alimentary canal by the gas insufflated through the rectum. In one of those cases the author was himself the subject, and he relates his experience as follow:

"Under a pressure of $\frac{1}{2}$ pound (.4 kilogram), nearly 6 litres of gas were insufflated *per rectum*. The distention of the colon caused simply a feeling of distention along its course, but as soon as the gas escaped into the ileum colicky pains were experienced, which increased as insufflation advanced, and only ceased after all the gas had escaped, which was the case only after an hour and a half. When the intestines and the stomach had become fully distended the feeling of distention was distressing, and was attended by a sensation of faintness which caused a profuse clammy perspiration. A great deal of the gas escaped by eructation, which was followed by great relief. The colicky pains attending the inflation of the small intestines by air or gas are evidently caused by increased peristaltic action of the bowels in their attempt to expel their contents, as it always assumed an intermittent type and subsided promptly after the escape of the gas."

In none of these experiments did the pressure exceed 1 pound (.4 kilogram) in overcoming the resistance offered by the ileo-cæcal valve, and often a steady long continued pressure of $\frac{1}{4}$ or $\frac{1}{3}$ pounds (.1 to .15 kilogram) sufficed. Every time the ileo-cæcal valve was rendered incompetent by distention of the cæcum the pressure was promptly diminished owing to the escape of gas from the colon into the ileum. In the experiment where the inflation was made in a case of typhlitis the ileo cæcal valve offered no resistance, and the gas escaped freely into the ileum; the valve in all probability had been rendered partially or completely incompetent during the course of the local inflammation, or the indurated, thickened walls of the cæcum, when distended during the inflation, were better adapted in effecting incompetency of the valve. These experiments also furnish strong proof of the fact that inflation, to be safe and effective, should be done very slowly under a

low, steady pressure, continued only for a short time, and is attended by no risks whatever of rupturing a healthy intestine and, when cautiously practiced, can be resorted to even in cases where the resisting power of the intestinal wall has been diminished by antecedent pathological processes.

The experiments, to which reference has already been made, on man and dogs, have fully demonstrated the safety of pure hydrogen gas when employed in this manner, as not in a single instance were any immediate or remote toxic symptoms observed which could be referred to absorption of the gas; hence we have the assurance that the inflation of a large quantity of hydrogen gas is unattended by any risk whatever, as far as intoxication is concerned.

As it was necessary however, that the gas should not only be harmless when injected into the uninjured alimentary canal, but that it should also be innocuous and non-irritating when brought into contact with other tissues, several experiments have been made. By these it was shown that the gas was innocuous, and free from irritation when brought into contact with the tissues most susceptible to inflammatory reaction in the living body—the peritoneum, the pleura, and the subcutaneous cellular tissue. They also show that hydrogen gas is removed by absorption in a comparatively short time when injected into serous cavities or into the subcutaneous connective tissue.

His experimental work closed with nine experiments upon dogs to show the value of his procedure in the diagnosis of penetrating gunshot wounds of the abdomen. In these experiments the animals were strapped on one of Pasteur's operating tables. The abdomen was shaved, and after complete etherization the shooting was done at short range with a 32 calibre revolver. Inflation of hydrogen gas was practiced immediately after the shot was fired, and its escape from the wound was shown by igniting it at the mouth of the injury. It burned with a steady blue flame as long as the gas continued to escape. After this the abdomen was opened and its contents examined for visceral injuries. In all cases where the colon was perforated inflation could be done under very slight pressure, as the gas readily escaped into the peritoneal cavity, and from there through the bullet wound in the abdominal wall, where it was ignited as it escaped.

In all of these experiments, the bullet was fired through the abdomen from side to side transversely or somewhat obliquely, directions which invariably brought into the track of the bullet a number of intestinal coils and often the colon likewise. In the two experiments where the track of the bullet was a little higher up the intestines escaped, but the stomach showed two perforations; one near the pyloric, and the other near the cardiac extremity. Rectal insufflation of hydrogen gas proved an infallible test in every instance, except in the case where it failed on account of the inflation apparatus being out of order. Contrary to the experience of other experimenters, it was found that fæcal extravasation does not uniformly take place soon after gunshot wounds of the intestines, and in the cases where it was observed some part of the colon had been wounded. Intestinal inflation does, therefore, not tend to increase the frequency of this occurrence, and must therefore be looked upon as a harmless measure in this direction.

Inflation, as a preliminary measure, greatly expedites the first step in the operation of abdominal section in cases where the intestine has been perforated or injured, as the gas which escapes into the peritoneal cavity separates the intestine from the anterior abdominal wall, and the incision can be made safely and rapidly without fear of wounding the intestines. Penetrating wounds of the abdomen, where the course of the bullet is in an opposite direction to that which has been described in the preceding experiments, that is in an anterior direction, may not implicate the intestines at all, or if visceral injury is inflicted, it is more likely that only a single perforation exists, and never does the surgeon meet with such a multiplicity of lesions as has been cited above. Unless the surgeon can ascertain beforehand that in a case of penetrating wound of the abdomen an injury to some portion of the gastro-intestinal canal exists, the very means which he resorts to in making an anatomical diagnosis is often an imminent source of danger, as only too often he may have to examine every inch of the gastro-intestinal canal for this purpose, a procedure which is always attended by great risk to life. If by such a simple and harmless procedure as insufflation of hydrogen gas he can satisfy himself that the gastro-intes-

tinal canal is perforated, the course to pursue becomes clear—to open the abdomen, *seek for the perforation until he finds it*, and to adopt the proper treatment for the visceral injury.

Cases have also happened in which the operator opened the abdomen, sought for, found and treated one or more perforations, and on making the autopsy a day or two later found to his great chagrin and sorrow, a perforation which he had overlooked at the time of operation. The author thinks that in cases in which any doubt exists as to the integrity of the remaining portion of the intestinal canal, after closing one or more perforations, it would be advisable to search for additional perforations by resorting again to slow and careful inflation before the abdominal wound is closed. If no other perforation exists the gas will be confined to the interior of the gastro-intestinal canal, and if the stomach or intestines, at some point difficult of access, are injured, the leakage of gas through the perforations will lead the surgeon to the wound.

In the practical application of rectal insufflation of hydrogen gas, as a means of diagnosis in penetrating wounds of the abdomen, the field of possible operation should be carefully prepared by shaving and disinfection before inflation. After thorough disinfection of the external wound or wounds, and the field of operation, the patient should be placed thoroughly under the influence of an anæsthetic for the purpose of relaxing the abdominal muscles, which greatly facilitates the inflation. In the absence of a Wolf's bottle hydrogen gas can be readily generated in a large wide-mouthed bottle into which a small handful of chips of pure zinc is placed. The mouth of the bottle is closed with a cork with two perforations, through which two glass tubes are inserted, one for the purpose of pouring in water and sulphuric acid, and the other, which should be bent nearly at right angles, for leading away the gas. This glass tube and the rubber balloon with a capacity of 16 litres of gas are connected by means of a rubber tube. In from five to ten minutes the requisite amount of gas can be generated and every thing is ready for the inflation. The rubber tube connecting the balloon with the rectal tip of an ordinary syringe should be interrupted by a stop-cock, so that the escape of the gas can be prevented when-

ever inflation is temporarily suspended. The return of gas along the sides of the rectal tip can be readily prevented by an assistant pressing the anal margins firmly against it. The inflation must always be made *slowly*, as *long continued, uninterrupted pressure accomplishes most effectually lateral and longitudinal dilatation of the cæcum*, conditions which render the ileo-cæcal valve incompetent, and which must be secured before inflation of the small intestines is possible. The entrance of gas from colon into ileum is always attended by a diminution of pressure, and its occurrence can invariably be recognized by a gurgling or blowing sound over the ileo-cæcal valve, and sometimes the sounds are sufficiently loud to be heard at some distance.

If, after inflation, abdominal distention and tympanites be from the very first diffuse, and liver dulness has disappeared, it is a certain indication that it is due to the presence of gas in the peritoneal cavity and not to distention of the gastro-intestinal canal. If, on the other hand, the distention and tympanites follow the course of the colon, and after the entrance of the gas through the ileo-cæcal valve is circumscribed and limited to the umbilical and hypogastric regions, and gradually extends to the upper portion of the abdomen, *and the liver dulness is displaced upwards*, it is in all probability caused by a gradual and successive inflation of the intact bowel in an upward direction. In some penetrating wounds of the abdomen it is difficult, if not impossible, to follow the course of the bullet through the abdominal wall with a probe or finger on account of the relative change of position of the different layers of tissues in the track of the bullet obliterating the canal, but even in these cases a moderate distention of the peritoneal cavity by an accumulation of gas outside of the intestines will force bubbles of gas through the tortuous canal, and by this sign the surgeon may know positively that some portion of the gastro-intestinal canal has been perforated, and in order to prove that the bubbles which escape are part of the hydrogen gas which has been inflated he applies a lighted match or taper, and if it is hydrogen gas it will ignite with a slight explosive report, and burn with a characteristic blue flame. The burning of the escaping hydrogen gas on the surface of the external wound is a most effective means in securing for the wound

an aseptic condition, and on that account the escaping gas should be lighted both for diagnostic and therapeutic purposes in all cases in which rectal insufflation of hydrogen gas reveals the presence of visceral injuries of the gastro-intestinal canal.

As the hydrogen gas from its low specific gravity will always occupy the highest space in a cavity partially filled with fluids, it is necessary to place the external abdominal wound in such a position that blood or any other fluid that may be present in the abdominal cavity will not interfere with its ready escape. If the wound is anterior the patient must be placed in dorsal position; if lateral, on the opposite side during inflation. If during inflation early and diffuse tympanites takes place, it speaks in favor of perforation of the colon.

Should the external wound prevent the escape of the gas from the peritoneal cavity by sliding of the different layers of tissue of the wound in the abdominal wall, or by the presence of a coagulum in the track made by the bullet, it becomes necessary to secure a sufficient degree of patency of the wound for the escape of the gas by careful probing or the removal of coagulated blood. The finding of perforations is also greatly facilitated by inflation, as the bowel below the lowest perforation will always be found at least slightly dilated by gas. If this perforation is now closed and additional perforations are suspected to exist the inflation can be repeated, and the bowel will again become distended as far as the next perforation, and this process can be repeated until the entire intestinal canal has been examined by this method. By searching for leaking points in this manner but little manipulation of the intestines becomes necessary, and thus one of the great sources of danger in the operative treatment of wounds or perforations of the gastro-intestinal canal is avoided. The moderate distention of the intestines left after treating the visceral wounds never interfered with the return of the intestines into the abdominal cavity or the closure of the external wound in any of the experiments, and the numerous observations made in reference to the disappearance of the gas by absorption, or escape through the natural outlets, are conclusive in showing that the distention due to the presence of gas disappears in a remarkably short time, and it can, therefore, be safely

stated that rectal insufflation of hydrogen gas in the diagnosis and treatment of penetrating wounds of the abdomen does not interfere with an *ideal* healing of the visceral and laparotomy wounds.

Dr. Mackie, of Milwaukee, is the first to have reported the use of this method upon the human being.¹ A colored man, æt. 27 years, had received a .38 calibre pistol shot wound two inches to the left of the linea alba, and one inch below the costal arch, passing out in the left lumbar region close to the spine and one inch above the iliac crest. Rectal sufflation according to the method of Senn was practiced and the escape of gas was demonstrated only upon pressure after the abdomen was greatly distended. The ignition test was not employed. Upon abdominal section two perforations were found in the stomach and at the junction of the duodenum and jejunum two perforations were found together with one perforation of the transverse meso-colon and two of the mesentery. These were all sutured, but the patient died of septic peritonitis thirty-six hours after the receipt of the injury. This case presented a test of the diagnostic method of the severest kind, owing to the lack of symptoms of perforation.

This method has found another field in the service of Dr. W. W. Keen at St. Agnes Hospital in Philadelphia.² The patient had a fæcal fistula on the left side of the abdomen. The question as to whether a lateral or a median incision should be made depended upon whether the proximal opening was in the large or small intestine; the distal opening threw no light upon this point. In order to determine the question, inflation of the bowel by hydrogen gas was used by Dr. Keen, since, if the gas escaped by the fæcal fistula before any gurgling occurred in the ileo-cæcal valve, it would prove that the opening was in the large intestine; if however the gurgling sound was heard as the gas passed through the ileo-cæcal valve prior to its escape from the fistulous opening, it would be proof that the

¹Gunshot wound of the Abdomen. Perforation diagnosticated by Rectal Insufflation of Hydrogen Gas; Laparotomy; Death from Septic Peritonitis. By William Mackie, A.M., M.D. (Milwaukee, Wis). *Medical News*, June 9, 1888.

²On the use of hydrogen gas to determine the site of a fæcal fistula whether in the large or small intestine. By William J. Taylor, M.D. (Philadelphia). *Medical News*, June 9, 1888.

opening was in the small intestine. The gas injected into the rectum escaped from the faecal opening before any gurgling at the ileo-cæcal valve, and was identified by the flame, and it was clear that its proximal extremity was in the large bowel. Upon incision this was found to be the case, the canal originating in a carcinomatous growth at that point.

It seems clear that Prof. Senn has added to the surgeon's armamentarium a procedure of the greatest diagnostic value. It is a question, however, whether the hydrogen injected might not combine with certain of the gases produced in the gut; and form an explosive compound which might precipitate the death of the patient. A demonstration of the innocuity of the method from this stand point would still further define its value.

Dr. Senn closes his paper with the following propositions :

1. The entire alimentary canal is permeable to rectal insufflation of air or gas.
2. Inflation of the entire alimentary canal from above downwards through a stomach tube seldom succeeds, and should therefore only be resorted to in demonstrating the presence of a perforation or wound of the stomach, and for locating other lesions in the organ or its immediate vicinity.
3. The ileo-cæcal valve is rendered incompetent, and permeable by rectal insufflation of air or gas under a pressure varying from one-fourth of a pound to two pounds.
4. Air or gas can be forced through the whole alimentary canal from anus to mouth under a pressure varying from one-third of a pound to two pounds and a half.
5. Rectal insufflation of air or gas, to be both safe and effective, must be done very slowly and without interruptions.
6. The safest and most effective rectal insufflator is a rubber balloon large enough to hold 16 litres of air or gas.
7. Hydrogen gas should be preferred to atmospheric air or other gases for purposes of inflation in all cases where this procedure is indicated.
8. The resisting power of the intestinal wall is nearly the same

throughout the entire length of the canal, and in a normal condition yields to diastaltic force of from eight to twelve pounds of pressure. When rupture takes place it either occurs as a longitudinal laceration of the peritoneum on the convex surface of the bowel, or as multiple ruptured from within outward at the mesenteric attachment. The former result follows rapid, and the latter slow inflation.

9. Hydrogen gas is devoid of toxic properties, non irritating when brought in contact with living tissues, and is rapidly absorbed from the connective tissue spaces and all of the large serous cavities.

10. The escape of air or gas through the ileo-cæcal valve from below upwards is always attended by a blowing or gurgling sound, heard most distinctly over the ileo-cæcal region and by a sudden diminution of pressure.

11. The incompetency of the ileo-cæcal valve is caused by a lateral and longitudinal distention of the cæcum which mechanically separates the margins of the valve.

12. In gunshot or punctured wounds of the gastro-intestinal canal insufflation of hydrogen gas enables the surgeon to demonstrate positively the existence of the visceral injury without incurring the risks and medico-legal responsibilities incident to an exploratory laparotomy.

JAMES E. PILCHER.

THE CURE OF VARICOCELE.

I believe it would be a strictly true statement to say that the belief is almost universal among medical students and junior practitioners that varicocele is a complaint practically incurable without operation, and that after a by no means difficult operation cure results almost as a matter of course. If there is any scientific objection to operation at all it is commonly supposed to lie in the fact that a small, a fractional percentage of cases die or at all events present very alarming symptoms which indicate how near to death the operation may bring an unlucky patient. All these ideas seem to me to be fostered by the text books, and especially by the practice of calling all non operative treatment "palliative" and all operative measures "radical."

After paying a good deal of attention myself to the exceedingly common complaint under notice, and after watching the practice of other surgeons who take a special interest in the subject, I have, year by year, grown convinced that the so-called "palliative" treatment may if properly executed be made more truly "radical" than the operative treatment often turns out to be, even when the latter is executed by experienced specialists.

Relapses so-called, after operation, are common but often they are not genuine relapses after all: they are rather cases in which only a small proportion of the veins affected have really been influenced by the operation, the rest having, from the first, escaped.

It is no doubt a fortunate thing that it is not possible by a subcutaneous ligature to tie every vein which carries blood back from the testicle, otherwise operation, as commonly practised, would be much more mischievous than it is. As a matter of fact I believe that often not half the veins are tied and that frequently the very veins which escape are those which are most varicose. No doubt experience, especially if accompanied by observation of the patients for long periods subsequent to operation, will enable a surgeon to do better and better, and probably beginners are sometimes made a little over-

cautious by proper respect for the cord; but I have seen relapse or failure after operations done by skilled men who made this and allied classes of cases a specialty.

Further, after an open operation in which I carefully separated the varicose veins in several packets and tied each packet separately in two places, dividing the intermediate segments with scissors, also taking particular care to include every large vessel, in fact leaving alone no veins except a few small ones just to return the blood from the testicle, after an operation like this, I have seen a partial return of the varicocele within a few months.

Nor ought one to be surprised at this. The tendency to relapse after far more radical operations on varicose veins of the legs than are usually performed on varicocele is well known, and although the operations for varicocele have an anatomical advantage over those done for varicose veins with deep anastomoses like those of the leg, yet the conditions are sufficiently alike for the parallel to be of some value.

But the particular point of which I think the importance is least remembered is that varicoceles so frequently tend to spontaneous recovery, slowly perhaps, but none the less surely. Can anyone who has much occasion to examine the genitals of numerous men and youths of different ages doubt this? How common is varicocele in early manhood compared to what it is in middle life! It would be too absurd to suppose that this is because the young men with varicocele die. They survive, but their varicoceles very frequently do not, at all events in a state other than as shadows of their former selves.

With this great fact in mind, how can surgeons justly continue to regard the treatment of varicoceles by appliances as merely *palliative*? If they were not satisfied that any appliance existed capable of assisting the tendency of time to work a cure I should have thought they would have not remained content until they had contrived one.

But as a matter of fact such an apparatus does exist. It is the suspender which I described in the *Lancet* nine years ago, and which has been worn by many persons since, benefiting nearly all, and, with the assistance of time and nature, curing some as radically as did any ligature ever tied.

The special feature of this suspender is that it gives just enough support to the dilated veins and no more. It can therefore, when properly adjusted, be worn for years without unduly compressing the testicles.

It is extraordinary how little pressure has to be applied to a varicocele in order to make or rather persuade its vessels to contract to normal calibre.

The material which gives the requisite degree of elasticity is *wool*; and I know of no other substance which will do it. India rubber in any form or combination is out of the question. One might as well use steel at once. The strength of its elasticity and its impermeability entirely unfit it for being the material out of which to make the bag of the suspender. On the other hand the strength, lightness, smoothness and stiffness of India rubber admirably fit it to be used in the accessories of the bag, wherein such qualities are particularly required.

The suspender is made by Messrs. Arnolds, of 36 West Smithfield, London.

There are, it is not to be doubted, varicoceles, which, from their size or from considerations personal to particular patients, require operative interference, but that does not destroy the truth of the statement that a varicocele may often be more radically, if not so quickly cured by prolonged use of a proper suspender than by operation.

C. B. KEETLEY.

INDEX OF SURGICAL PROGRESS.

HEAD AND NECK.

I. Case of Cerebral Abscess in Connection with Otitis Media, Successfully Diagnosed and Evacuated. By D. FERRIER, M.D. (London) and VICTOR HORSLEY, F.R.C.S. (London). Two cases similar to this one have been recorded, and also two others which differed materially in that they presented, in addition to the general symptoms, external indications of the seat of abscess in the shape of localized pain and œdema of the skull, and a fistula leading from the primary seat of disease.

The latter two cases, (referred to by Greenfield) are reported, respectively, by Schondorff (*Monatschrift f. Ohrenheilkunde*, 1885, No. 2), and by Trinckenbrod (translated in *Archives of Otology*, June to September, 1886).

The two formerly mentioned cases are that of Gowers and Barker (*Brit. Med. Jour.*, Dec. 11th, 1886), and that of Greenfield (*Brit. Med. Jour.*, February 12th, 1887). The former was a case of abscess in the right temporo-sphenoidal lobe associated with suppuration in the middle ear and mastoid cells. The mastoid was trephined first and symptoms persisting, the cranial cavity opened afterwards. In Greenfield's case an abscess was situated in its anterior part of the left temporo-sphenoidal lobe. In addition to the general indications of abscess, there were symptoms of pressure on the third nerve, a fact which prohibited the localization of the seat of the abscess.

Ferrier's and Horsley's case, therefore, is to be classed with Gowers' and Barker's and with Greenfield's case, and, from its importance, deserves careful study.

T. H., æt. 47, male, taken ill on Nov. 10th, 1887. Nov. 15th, discharge, rather offensive, from left ear. Seen first Nov. 25th, he had

pain over left side of head, forehead and back of eyes, with a considerable degree of photophobia. The pain was interrupted by pressure and percussion. Still slight discharge from left ear which could not be examined because of its tenderness. Pupils and vision normal. No motor or sensory paralysis. P. 52, weak and intermittent; resp. 14, labored and sighing; temp. normal. Improvement for four days, but patient generally sleeping. More discharge from ear.

Nov. 30th, very drowsy; difficult to arouse. More pain at back of eyes. Headache. P. 60; resp., 16; temp. absolutely normal.

Dec. 1st and 2d. Similar, but more drowsy.

Dec. 3d. Temporary delirium.

Dec. 5th. Slight weakness in right angle of mouth.

Dec. 6th. Speech affected; wrong words used.

Dec. 8th. Dr. T. W. Coffin in whose charge the patient was, called in Dr. Ferrier. Patient now less drowsy and much clearer in intellect than he had been for some time. But his words were incoherent and, for the most part, unintelligible. Partial paralysis of right angle of mouth. Abscess of brain diagnosed and patient's removal to hospital advised.

Patient seemed slow to understand what was said to him. Spoke more intelligibly but often used wrong words. Grasp of right hand, 80 pounds, and of left, 100 pounds, (patient right-handed).

Well-marked optic neuritis, with a small hæmorrhage over the right disc, and a whitish band below that of the left. Taste and smell normal. Watch, on left side, heard only on contact. Left auditory meatus full of purulent secretion. No pain in head. Spot tender to pressure and percussion two inches above and just anterior to a line drawn upward from the external auditory meatus.

Diagnosis.—There had been no vomiting, convulsions or febrile disturbance or other indications of meningeal inflammation. The onset had been too rapid for tumor: besides there were the aural discharge, etc.

Dr. Ferrier "had no doubt that the patient was suffering from cerebral abscess." With regard to there having been no rise of temperature, many cases of cerebral abscess appear to run their course without

causing febrile disturbance, the temperature being in some rather sub-normal than the reverse."

Localization.—This was effected by (1) consideration of the weakness of the right angle of the mouth, the ataxic speech, and slight degree of 'word-deafness,' and (2) the discovery of a tender-spot. The situation of 2 confirmed the indications drawn from 1. The disease was likely to be in close proximity to the speech and auditory centres of the left hemisphere, but not actually destroying them. Such a lesion would be an abscess situated in the anterior third of the temporo-sphenoidal lobe and abutting or pressing on the fissure of Sylvius.

It is true that the position of the tender spot is not an infallible guide to localization, *e.g.* Mr. Hulke (*Brit. Med. Jour.* July 3d, 1886), records a case in which there was a tender spot above the ear, whereas the abscess was in the cerebellum; and in a second, pain was felt acutely in the occiput, whilst the abscess was in the temporo-sphenoidal lobe. Nevertheless the presence of a tender spot, if its situation corresponds with the other symptoms, is very significant.

Mr. Horsley reports the *operation*, (previously pointing out that the optic neuritis, though intense on both sides, was worse on the side opposite to the abscess (as in Gowers' and Barker's case).

Dec. 10th, 1887, Chloroform, head aseptized, etc. External auditory meatus cleansed with boracic. T-shaped incision. Junction of lines corresponded with painful spot; perpendicular descended to front of ear. Temporal muscle and periosteum reflected together. Bone doubtfully yellow at tender spot. Inch disc removed. Dura congested, bulging, without pulsation; dark purplish. Dura opened; dark red œdematous brain tissue bulged strongly through incision. As it was fairly certain that the abscess extended deeply into the temporo-sphenoidal lobe, the lower half of the circumference of the hole in the bone was cut away into a V-shaped notch. The dura was opened further by another incision vertical to the first. Brain punctured by ordinary trocar and canula (about 3 millimètres diameter) pus found at a depth of 1 centimètre. Amount of pus 5v, inodorous and creamy. Canula kept in until no pus and only blood oozed through it, and then replaced by the inner tube of a small tracheotomy canula; (this was changed next day for a smaller silver drainage tube).

No syringing, pus so inodorous. Parts readjusted; sutures; compound antiseptic dressing (carbolic, boracic and sal alembroth); temp. rose to 101° on second night; then fell to normal and remained so.

Vomited a little for a day or two. Aphasia, etc., gradually passed away.

January 5th. (26 days after operation) The paralysis, or rather paresis, had apparently disappeared, but the grip was still deficient on the right side, viz: 90-100. The fundi oculi, examined by Mr. Brudenell Carter, showed no trace of hæmorrhage, and swelling of disc had almost vanished.

Such is the history (in abstract) of this excellent example of an interesting class of cases, now shown to be amenable to surgical treatment of a kind not very difficult or dangerous.

C. B. KEETLEY (London).

II. Fracture of the Larynx; Emphysema of the Neck; Laryngotomy—Death. By F. H. BARENDT (Booth.).—The patient [age not stated] was a foot-ball player, and during the course of the game he received a violent blow over the trachea from a man's elbow. He was admitted suffering from stridulous dyspnea; speech was painful and voice husky. Expectored blood-stained phlegm; subcutaneous emphysema of neck on both sides. Handling the thyroid caused great pain, and while doing so crepitus could be felt on the left side. Punctures were made to let out the air and relieve the tension of the tissues, and the dyspnea was relieved by this procedure. The symptoms, however, subsequently increased in severity, and suffocation being imminent, laryngotomy was performed. During the operation, which was difficult, owing to the inflated condition of the parts, it was found that the left ala of the thyroid was fractured, but not separated completely from its fellow. The lower margin of the left alar cartilage was divided, and the knife was inserted here and prolonged downward, cutting through the crico-thyroid membrane. Immediately air had free access, and the patient quickly became intelligible. A Bryant's tracheotomy tube was inserted and the patient placed under a steam tent. The case progressed favorably upon the

whole for a few days, but in the end died of septic pneumonia, as was discovered at the postmortem examination.—*Lancet*, March 3, 1888.

H. PERCY DUNN, (London).

III. A Danger in the Prolonged use of a Silver Tracheal Tube. By DR. ST. SYCZ. ZALESKI. (Dorpat).—A silver tracheotomy tube was brought to Dr. Zaleski which had been in the trachea of a patient for about two years, and during that time had never been removed. "Of the tube there only remained, owing to the solvent action of the contents of the air passages, the merest shell, in appearance like a kind of coarse cobweb." His explanation is that the chloride in the secretions acts on the silver, forming a chloride of silver, and this is dissolved by the alkaline secretions containing ammonia and cyanides. Dr. Zaleski is unaware if the patient suffered from agyria.

H. H. TAYLOR (London).

IV. A Case of Gastrostomy for Malignant Stricture of the Œsophagus. By A. M'PHEDRAN, M. B. (Toronto, Ont.)—A woman, æt. 41, had presented symptoms of cancer of the œsophagus, with resulting stricture, which finally after eighteen months began to interfere with alimentation to such an extent that starvation was imminent. The operation was done in two stages with an interval of ten days. At the first operation the stomach was brought to the abdominal opening and fastened with harelip pins according to the method of Macnamara. Ten days later, the stomach having become thoroughly adherent to the wound, the viscus was opened with a narrow tenotomy knife. The operation was successful in relieving the imminent danger of death from hunger and thirst, but the morbid processes continued, the patient eventually falling into a decline and dying from an attack of hypostatic pneumonia six months and eighteen days after the operation,—*Canadian Practitioner*, July, 1887.

JAMES E. PILCHER (U. S. Army).

CHEST AND ABDOMEN.

I. Cases of Stomach-Resection in Billroth's Clinic During 1837. By DR. F. SALZER (Vienna). This is a comprehensive

tabulation of every important feature in the 4 cases. 1. Cicatrix about a round ulcer (diagnosis, pyloric cancer); resection of pyloric end, cure. 2. Cysto sarcoma of stomach wall. Extensive resection nearly to the pylorus; cure (as yet of but five weeks' duration). 3. Similar to case 1; recovery. 4. Cicatricial pyloric stenosis. Cuneiform excision not including the whole circumference. Improvement at first. Death in two weeks from circumscribed peritonitis about an abscess at the pylorus (originating in foreign material passing an ununited spot). Diagrammatic cuts indicate the seat of disease and extent of excision in each case. Case 1 was operated by Salzer, the others by Billroth himself. Case 2 is more fully reported in Nos. 4 and 5 of the same journal.—*Wien. Med. Wochr.*, 1888. No. 2.

WM. BROWNING (Brooklyn).

II. Gunshot Wound of Liver Complicated with Compound Comminuted Fracture of the Ribs. By A. P. FRICK, M.D. (Fort Selden, N. M.) A healthy man, æt. 57, accidentally received a .44 calibre pistol shot wound, $5\frac{1}{2}$ inches to the right of the anterior median line of the body, and about midway between the axilla and the anterior superior spinous process of the ilium, emerging posteriorly about one inch lower, and $5\frac{1}{2}$ inches from the posterior median line of the body. The portions of the 7th, 8th and 9th ribs lying in the track of the ball were comminuted. Profuse hæmorrhage continued for more than twelve hours when it ceased spontaneously. Five days later, under ether, the two wounds were connected by an incision, the loose fragments of bone removed and the sharp edges rounded off. This exposed a lacerated wound of the right lobe of the liver, with an abscess one and a half inches deep about in the middle of the exposed portion of the liver. The lacerated parts were trimmed, and the abscess opened, drained and irrigated. A drainage tube was then inserted and the wound closed with interrupted suture, sublimate dressings applied and the patient proceeded to a good recovery, complicated only by some troublesome bed sores and a slight necrosis of the proximal end of the 9th rib, being discharged perfectly recovered three months later.—*Phil. Med. Times*, May 1, 1888.

JAMES E. PILCHER (U. S. Army).

III. Two Cases of Cholecystotomy. By STUART NAIRNE (Glasgow). Case I.—A woman, æt. 54. came to the hospital, complaining of intense pain over epigastrium. She was sick, vomiting, and slightly feverish—similar attacks of frequent occurrence, lasting about 24 hours. Some fulness was detected in the epigastric region, extending vertically to the right of the mesial line—reaching from the right hepatic side downwards and across toward the left iliac fossa. There was pain on pressure; medical treatment had given no relief, and cholecystotomy was performed by the author on the third day. The gall bladder was pressed firmly against the abdominal parietes, and on being incised gave vent to a saucerful of extremely thick consistent bilious matter. No stone could be detected with the finger. A stitch was put through the lower part of the wound, including the edge of the gall bladder, a drainage tube inserted, and a large pad of absorbent iodoformed cotton wool put on. The recovery was uninterrupted. The pain and vomiting ceased. For several days there was a discharge of bilious matter, which gradually decreased, and the wound closed. She was discharged cured on the twenty-first day.

Case II. A woman [age not stated] had suffered frequently from gall stones, though none had ever been found in the stools. During the paroxysms of pain the administration of chloroform was resorted to, and on various occasions had been kept up for six hours until relief was obtained. Upon examination the author found a pyriform tumor extending from the ribs slightly to the right of the middle line down below the umbilicus. It was painful to touch. Cholecystotomy was performed. The gall bladder was pressed up hard against the abdominal parietes. The opening was made about the upper third of the tumor, giving exit to a quantity of bile. The edges of the incision into the bladder were retained in position by hooked forceps. The finger passed in detected stones, which were taken out with a small spoon. Three stitches were put in to retain the gall bladder in contact with the abdominal walls. As there was not the slightest suspicion that any extraneous fluid had escaped into the peritoneal cavity, there was no attempt at sponging. An india rubber drainage tube was inserted, and the wound dressed with iodoformed absorbent cot-

ton. The patient, who at the time of the operation, was extremely emaciated, made an uninterrupted recovery, and felt so well in a few days that she desired and was permitted to get up. The author appends some remarks, in which he states that he has incised the liver and gall bladder seven times, and has never had a fatal case. "The greatest risks are want of cleanliness in doing the operation and poking too much about the wound."—*Lancet*, March 31, 1888.

H. PERCY DUNN (London).

IV. Additional Series of Eleven Cases of Cholecystotomy. By LAWSON TAIT (Birmingham). Mr. Tait states that with the exception of one case which subsequently died of phthisis, all his previous cases numbering thirty are now alive. Of these additional eleven cases only one died, the fatal result being attributed to the advanced age (61 yrs.) and anæmic condition of the patient. He concludes with the following remarks. "The one question still under discussion for the surgical treatment of gall stones is as to whether the gall-bladder should be removed or not; for I cannot think it worth while discussing the fanciful operations of stitching the gall-bladder to pieces of the intestine. Such operations would not be possible in cases where they would be most required, those of suppurative cholecystitis; in fact in the majority of cases where I have operated in the presence of suppuration of the gall-bladder such operations would be perfectly impossible; and in the cases of multiple gall-stone where there has been no suppuration I do not think them in the least degree desirable. I, therefore, limit what I have to say to the two points of removing the gall-bladder or simply stitching it to the abdominal walls. In cases where suppuration has made the gall-bladder contracted and firmly adherent to deep structures, its removal would be a terrible proceeding, in fact, one which in the majority of these suppurative cases could not be completed. The only argument I have found in its favor is a supposed possibility of the return of the disease. But my cases now go back as far as Sept. 1878, and I cannot find in any of them the slightest indication of the recurrence of the disease, even if there were any tendency in this direction, as I have secured in all these operations the base of the gall-bladder in the cicatrix, a puncture with a bleeding

lancet will be quite enough to enable us again to evacuate the morbid contents of the gall-bladder if that became necessary. The more experience I have in dealing with these cases, the less necessity, it seems to me, there is for anything more than the simple process of cholecystotomy, and the extremely favorable results obtained from it seem to me to put it within the first rank of modern operative proceedings."—*Lancet*, April 14, 1888.

H. H. TAYLOR (London),

V. A Case where a Suppurating Spleen was Opened and Drained. By Messrs. CATON & REGINALD HARRISON (Liverpool). The patient, æt. 30 years, was admitted on December 9, 1886, complaining of shooting pains in both legs, particularly the left, with some swelling, no history of ague, and except for an attack of acute rheumatism, the history generally was negative. His occupation was that of a painter, in which he was a good deal exposed to damp and cold. His present illness commenced a month ago with shooting pains and swelling in lower limbs from the groin downwards. On admission he appeared fairly nourished and healthy looking. No jaundice color was present, no œdema of face; there was fluid in both knee joints. Cardiac dulness was increased. Slight dulness over bases of both lungs, liver dulness was increased to four inches and a half. On the left side a dull area extended downward from the last rib for four inches, and this dulness could be traced forward up to within half an inch of the umbilicus. There was pain and tenderness in both lumbar regions, especially the left; the urine was normal in color: slight trace of albumen. During the next few days the pain and tenderness increased in the left lumbar region, and subsequently a distinct tumor was discovered coinciding anteriorly and superiorly with the area of dulness referred to above on the left side, and posteriorly terminating at the anterior superior iliac spine. The urine was found to contain pus, and hyaline casts and granular epithelium. The splenic dulness was found to be continuous with that of the tumor and splenic abscess or tumor was consequently diagnosed.

Fluctuation in the tumor having declared itself, an aspirating needle

was introduced two inches above the iliac crest, and nineteen ounces of dark chocolate colored fluid were withdrawn.

Repeated aspirations at intervals were practiced after this, and large quantities of pus were withdrawn, but the patient was losing ground and Mr. Harrison was called in consultation. Further surgical interference was deemed necessary, and an incision was made parallel with the last rib on the left side. On reaching the subperitoneal fat and connective tissue the finger was passed underneath the rib in an upward direction, when it entered a large collection of matter. About thirty ounces of pus of a dirty yellow color escaped through an opening, which was freely enlarged with the finger, the cavity was washed out with a weak solution of carbolic acid and a large drainage tube was inserted.

The patient rapidly improved after this operation. It subsequently became necessary in the course of the case to enlarge the wound in order to facilitate drainage, and to open an independent collection of matter along the line of Poupart's ligament on the left side. But after these procedures the patient's progress to recovery was uninterrupted, and he was discharged perfectly well.—*British Medical Journal*, Mar. 17, 1888.

H. PERCY DUNN (London).

VI. A Case of Omphalectomy for Strangulated Umbilical Hernia. By W. W. KEEN, M.D. (Philadelphia). A very fat woman, æt. 56 years, had an umbilical hernia about the size of a small pear for eighteen years. Six days before the operation the tumor became painful and inflamed, and symptoms of strangulated hernia followed. On the sixth day the tumor was exposed, a small enterocele reduced and an epiplocele excised. It being impossible to close the umbilical aperture, it was excised by a vertical elliptical incision six inches long with the umbilicus at the centre and the lips of this opening drawn together and united. The patient did not rally well, and death supervened the following day. The operator attributes the death of the patient to the exhaustion and fæcal vomiting, believing that an earlier operation would have saved her.—*Medical News*, Feb. 25, 1888.

JAMIS E. PILCHER (U. S. Army).

VII. Laparotomy and Drainage for Cysts of the Mesentery. By DR. COPPENS. In this paper the author directs attention to the occasional though very rare occurrence of cysts of the mesentery. He refers to seven cases published by Wells, Pean, Budener, Lawson Tait and Carter, in addition to the one he himself records. Diagnosis he believes to be extremely difficult, often impossible between these and ovarian or parovarian cysts, before operation. Sometimes he believes very careful and repeated percussion and auscultation might reveal the presence of a coil of intestine over the surface of the mesenteric cyst. Their nature is very obscure. The results of published cases shew that attempted excision of the cyst is highly dangerous, whereas, attaching the cyst to the abdominal wall, and there draining it is a means of treatment both certain and safe.—*Le Bulletin Médical*, Jan. 1888.

CHARLES W. CATHCART (Edinburgh).

VIII. Relapsing Typhlitis Treated by Operation. By FREDERICK TREVES, F. R. C. S. (London.) In the majority of the cases of so-called typhlitis the appendix is the cause of the trouble, and the perityphlitic abscess is more usually an encysted peritonitis due to perforation of this process than to disease in the cæcum. The appendix may become the starting point of inflammation by reason of congenital deformities, of changes that take place in its mesentery, producing bending, of the lodgement of foreign bodies and concretions that are encouraged to remain unmoved, on account of the feeble muscular coats of the tube. The source of manifold disturbance can be destroyed by removal of the appendix or by correcting any simple deformity of which it is the seat. The statistics of Fitz show that in 11 per cent. of the examples of this affection the patients were the subjects of successive attacks. In one case quoted five attacks occurred during eighteen months. A case of relapsing typhlitis in a man aged thirty-four was reported. After the subsidence of the second attack and during a period of freedom from all symptoms Mr. Treves performed laparotomy and found a diseased appendix, which was dealt with. The patient made a good recovery and remains free from further relapses.—*Lancet*, Feb. 18, 1888.

H. H. TAYLOR (London.)

IX. Laparotomy for Perforated Typhoid Ulcer. By R. B. BONTECOU, M. D. (Troy, N. Y.) A man *æt.* 25. had been affected with typhoid fever for fifteen days when he was seized with right iliac pain which increased during the two following days, on the latter of which collapse set in evidently from intestinal perforation. On abdominal section two perforations were discovered and closed, but unfortunately the operation had been delayed too long after the first perforation and *death* occurred before he recovered from the anæsthetic. —*Jour. Am. Med. Assn.*, Jan. 28, 1888.

X. Laparotomy for Perforated Typhoid Ulcer. By THOMAS S. K. MORTON, M. D. (Philadelphia) and THOMAS G. MORTON, M. D. (Philadelphia.) The author of the former paper quotes at length the case of KUSSMAUL of Strasburg, operated upon in October, 1885 and reported by Luecke in the *Deutsche Zeitschrift für Chirurgie* of the last year. A woman, *æt.* 28, developed typhoid fever subsequent to labor, and eight days later was seized with agonizing abdominal pain and symptoms of collapse. Under a diagnosis of perforated typhoid ulcer, the abdomen was promptly opened in the median line from the umbilicus to the symphysis. A single small perforation was found about a foot and a half above the ileo-cæcal valve; from it flowed yellow feculent material. The portion of the gut including the perforation was resected, the toilet of the peritoneum performed, and the external wound closed and dressed. *Death* occurred in eleven hours without reaction from shock. Autopsy showed broncho-pneumonia and hypostatic congestion, foul pus in Douglas' sac, and general peritoneal fibrinous exudate.

In 1886, Mr. T. H. BARTLEET, of Birmingham, in a case of perforated typhoid ulcer, made a median abdominal incision discovering great fæcal extravasation. After an unsuccessful hurried search for the perforation, the cavity was irrigated, a drain inserted, and the parietal incision closed, death occurring on the second day thereafter.

On the 13th day of November, 1887 T. G. MORTON operated upon a man, *æt.* 23. the subject of an apparently light attack of typhoid fever

but in whom intestinal perforation had occurred. Through an incision from the umbilicus to the symphysis the bowel opening was found and closed by turning in the whole area of the ulceration; another ulcer which threatened early perforation was also similarly turned in. The abdomen was thoroughly cleansed, and the wound closed and dressed. Six hours after the operation the patient sank into collapse and *death* supervened within an hour.

While these operations do not present a very encouraging outlook, they provide a precedent for an operation which must of necessity always be a forlorn hope. If successful results are to be obtained they will come from operations undertaken with the least possible delay after the accident. Three methods offer themselves (1) closing the perforation with Lembert's sutures, (2) resection of the diseased gut, (3) forming an artificial anus. A thorough examination of the bowels should be made to discover any other ulcer which is likely to perforate. —*Med. News*, Nov. 26 and Dec. 24, 1887.

JAMES E. PILCHER (U. S. Army).

EXTREMITIES.

I. A Case of Simultaneous Quadruple Amputation. By G. C. WALLACE, M. D. (Rock Rapids, Iowa.) A German boy, *æt.* 16, of robust constitution, was overcome by cold, suffering injuries which required the following operations fifteen days after the accident: (1) Both the right and (2) left arms were taken off half way between the elbow and wrist; (3) the right leg was amputated about three inches above the ankle joint; (4) a portion of the left foot was removed by an incision through the first row of tarsal bones, leaving three of them and cutting off the heel, leaving the *os calcis* exposed for over one inch; although gangrene of the soft parts had set in, the bone was healthy, and it was accordingly left in the expectation that the soft parts would again cover it, which ultimately occurred; (5) the point of the nose was excised. All the amputations were performed before any of the stumps were dressed or any vessels ligatured. The wounds were irrigated with a sublimate solution and dressed with an extemporized sublimate dressing. He was discharged 51 days later with all the

wounds entirely healed except one place about a half an inch in diameter.—*Med. and Surg. Reporter*, May 20, 1888.

JAMES E. PILCHER (U. S. Army).

II. Dislocation of the Head of the Fibula. By A. LEGGATT (London.) The patient whilst playing at football, slipped and fell with his left leg doubled up underneath him, so that as he described it, he, sat on his own foot. The pain was great, and at the time of the accident he felt something give way—the head of the fibula was found to be dislocated forwards, being plainly seen and felt beneath the skin—immediately behind and above the dislocated head of the fibula was a distinct hollow about one inch in diameter—the normal socket of the bone—the tendon of the biceps was very tense. The patient was removed to St. Thomas' Hospital with a view to the reduction of the bone under an anæsthetic. While the patient's boot was being taken off previously to the administration of ether he felt something give, and on examination the dislocated head was found less prominent. The reduction was effected by Mr. Battle, who in the early stage of the anæsthesia, held the leg semiflexed, having his right thumb on the front of the fibula below the head. While this was being done the patient kicked out, and thus brought the biceps into action, and the bone returned to its position with an audible snap. The leg was put up in plaster of Paris, which had to be removed in four days, to enable the patient to present himself for an examination; there was no effusion, and the appearance of the joint was quite normal—some remarks follow anent the rarity of the occurrence of the lesion.—*Lancet*, March 31, 1888.

H. PERCY DUNN (London.)

GENITO-URINARY ORGANS.

I. Stricture of the Rectum Following an Abscess of the Prostate. By DR. E. DESNOS. (Paris). The patient, a man, æt. 55, was admitted with an abscess in the perineum, to the left side, just behind the scrotum. After a free opening had been made, a probe was introduced and was found to go easily in a direction running along the left side of the median raphe. There was no burrowing towards

the rectum, and through its walls the fingers could not detect the end of the probe. The abscess was clearly connected with some trouble in the genito-urinary tract, and in that quarter was found a slight stricture of the bulbous portion of the urethra. An examination of the rectum by the finger revealed a thick band running all around the gut a short distance from the anus, and diminishing its calibre very markedly. The band was much more prominent on the anterior part and formed a semi-lunar valve. This was just at the base of the prostate, and when a search for this gland was made, no trace of it was to be found. There was some fibrous induration, but nothing to remind one of the bulging which usually accompanies the prostate of a man æt. 52 years. The man's history showed there had been an urethral discharge at the age of 20 years, which had been troublesome for two years and that symptoms of a stricture had been coming on of late years. But the most important fact was that two years ago he had noticed pus coming from the anus every time he defecated, and this was cured spontaneously after lasting two months. Subsequently he had been treated for an abscess in the right side of the perineum, which had left a fistulous tract, still to be seen.

This history showed that there had been a series of abscesses in the perineum and neighboring parts, and there could be little doubt that at one time suppuration had been going on in the prostate, or rather around it. No pus had ever been found in the urine, but it is well known that this can very well be the case. The pus had evidently been gradually let out, producing by its contact with the parts an induration and thickening. The glandular tissue of the prostate had been eliminated in the same way, and this explains why no trace of that organ was to be found.

The treatment adopted consisted in laying the whole tract freely open by means of the thermo cautery, and exposing all the undermined parts. At the same time the stricture of the urethra was gradually dilated. No successful result however was obtained.—*Gazette Médicale de Paris*, Dec. 10, 1887.

LEONARD MARK (London.)

II. Statistics of Stone Operations. By PROF. KOVÁCS (Buda-Pesth). Dr. Joseph Prochnov, of Buda-Pesth, compares Kovács' recent statistics with those published by Sir Henry Thompson, four or five years ago. There are, however, great differences between the ages of the patients, only fifteen out of Thompson's 716 having been children, while 115 out of 233 of Kovács' patients were children (*i. e.* under 20 years of age).

Kovács' statistics are as follows :

"Two hundred and thirty-three patients, on whom were performed 248 operations, with 21 and 18 deaths respectively, (8.5 % and 7.25 %). There were 77 lateral perineal sections, with 4 deaths, 2 suprapubic sections, with 1 death, 168 lithotrities, with 16 deaths, 1 extraction of calculi, with 0 death.

Three of the fatal lithotrities died of intercurrent diseases—viz: 1 "apoplexia cerebelli", 1 of Asiatic cholera, and 1 of pneumonia.

The cases of Prof. Kovács, classified in the same way as Sir H. Thompson's give the following results :

Thirteen female patients all lithotrities; no deaths, 115 under 20 years of age, 70 lithotomies, 2 deaths, 75 lithotrities, (4) 3 deaths; 117 male adults, 7 lithotomies, 2 deaths, 110 lithotrities (12) 10 deaths, 2 suprapubic sections, 1 death.

There was also one case of "extractio calculorum" probably "per urethram", age not stated.

By subtracting 2 out of 14 of Kovács' fatal cases in adults, (namely the cholera and the pneumonia cases), Dr. Prochnov comes to the conclusion that Kovács' results are slightly better than Thompson's namely as 10.2 % is to 10.5 %.—*Brit. Med. Jour.* May 12, 1888.

C. B. KEELEY (London)

III. The Surgery of the Ureter. By AXEL IVERSEN, (Copenhagen), P. MUELLER, (Germany) and HURRY FENWICK (London). The removal of the kidney is always a serious matter, for the necessary steps of the operation are severe. Deep incisions have to be made, and the finger must be used to explore recesses where delicate structures lie. When one kidney is removed the other may prove to be

diseased, death in that case being certain. Hence any method by which the desired unilateral character or the undesired bilateral nature of a renal affection, suited more or less for surgical treatment, can be ascertained, deserves due consideration. The temporary stoppage by compression of one ureter and the examination of the urine which flows into the bladder whilst the ureter is compressed, is, at present, perhaps, the most feasible proceeding by which the immunity or implication of one kidney can be ascertained in cases where renal tumor, calculous pyelitis, etc., is diagnosed. The catheterization of the ureter, and its stoppage for the arrest of otherwise uncontrollable hæmaturia are kindred topics.

Dr. Axel Iversen, of Copenhagen, took a yet bolder step last autumn. He laid open the bladder and looked at the urine as it issued from the two ureters. A man, æt. 38 years, had symptoms of calculous pyelitis, but the objective and subjective symptoms did not distinctly indicate whether one or both kidneys were implicated. He laid open the bladder above the pubes and illuminated the exposed cavity by the aid of electric light. From the right ureter an almost clear fluid was withdrawn; it issued intermittently from a fine catheter which was introduced into the ureteric orifice. On catheterization of the left ureter, on the other hand, pus escaped freely and with such rapidity as to suggest that it was subjected to much pressure from above. The urine from the right kidney was carefully examined. It contained abundant epithelial cells from the upper and middle portions of the urinary tract and a considerable quantity of hyaline and finely granular casts. Hence it was evident that the removal of the left kidney would be fraught with peril to the patient, and since pus flowed so freely from the left ureter there appeared, in Dr. Iversen's opinion, to be no necessity to make a lumbar incision and to pass a drainage-tube into the pelvis of the left kidney. The patient recovered from the suprapubic operation. Dr. Iversen did not believe in the catheterization or compression of the ureters; even in the female, catheterization with the aid of the cystoscope demands great dexterity and practice, and though the cystoscope allows the surgeon to see the ureteric orifices, it lies, as long as it is adjusted for that purpose, in the way of the ureteric catheter.

Dr. P. Müller has contrived a ureter-compressor for introduction into the rectum, on the principle of Mr. Davy's lever. He had tested in the *post-mortem* room the relations of the ureter to the pelvic walls. He stated that the ureter may be compressed by introducing the finger into the rectum, and slipping it along the side of the pelvis till it reaches a point one inch and a half above the spine of the ischium, in the direction of the pelvic brim. At that point the ureter may be compressed. Dr. Müller's compressor is an angular instrument with a short arm, which can be made fast by a bandage to the thigh, and bears a screw which allows the longer arm to be adjusted at a convenient angle. At the extremity of the longer arm is a bag, bearing a tube, by which it may be filled with mercury, after introduction in the flaccid state. The patient is placed on one side, and the long arm of the instrument bearing the bag is then introduced for about five inches up the rectum. Lastly, a funnel fitted with a long glass tube is connected with the tube attached to the bag, and mercury is poured in till the bag is filled. Nearly four pounds of mercury appeared to be necessary. It seems that Dr. Müller has only once employed this ureter-compressor on the living subject.

Dr. Tuchmann's ureter-forceps resembles a lithotrite, and one blade is hollow, so that the ureter in its course through the vesical walls may be grasped for a few minutes whilst urine escapes from the other ureter, and runs out of the hollow blade of the instrument. The urine thus collected is examined, and the opposite ureter is then compressed, and the urine which comes away during the period of its compression is tested. Dr. Tuchmann uses his ureter-forceps on male as on female patients.

Mr. Hurry Fenwick has advocated and practised a singular surgical proceeding of much ingenuity, to which he gives the term of 'clottage of the ureters'—'a definite and determined endeavor on the part of the surgeon to *cork* a ureter with a clot of blood. A man, *æt.* 53, came under Mr. Fenwick's treatment with symptoms of malignant disease of the right kidney due to an injury. There had been violent and persistent hæmaturia for fourteen months. A ureter aspirator was introduced into the right ureteric orifice, and suction applied. The in-

strument was soon filled with clot. A little blood was passed a few hours after, but from that date until the patient's death, six months later, there was no recurrence of the hæmaturia.

The ureter aspirator, mentioned above, is another contrivance of Mr. Fenwick's. It was designed for the direct catheterization of the ureter, for diagnostic purposes. The instrument is a catheter, to the handle of which an elastic ball is fitted after the extremity has been passed into the orifice of the ureter. The ball is applied in a flaccid state, pressed by the right hand; after it has been affixed to the catheter it is allowed to distend gradually. In this manner urine is sucked up into the catheter, and preserved for examination. The ureter aspirator is designed for male patients.

All the above proceedings are far too difficult and uncertain for general employment in private and hospital practice, and it is clear that the experts here mentioned differed greatly in their opinion as to the best means of diagnosing the extent of renal disease by surgical proceedings involving the ureters. There are many sources of fallacy. Growths in the region of the ureters greatly increase the difficulty of introducing an instrument, and the ureters may be displaced from their normal relations by disease. Mr. Fenwick has exhibited at the Pathological Society a specimen of atresia of the vesical orifice of the left ureter. Displacement or atresia would of course render incorrect any opinion derived from Tuchmann's or Müller's systems of temporary compression. Dr. Iversen's practice is heroic, and open to the objection (amongst others more obvious) that should both kidneys prove badly diseased, as in his case, the patient might speedily die after the exploratory suprapubic cystotomy. His objection to the cystoscope does not apply to every case where the ureteric orifices require inspection.—*Centralblatt f. Chirurgie*, No. 16, 1888; *Deutsche medicinische Wochenschrift*, 1887, No. 31; *Proceedings of the Medical Society of London*, vol. x., 1887, p. 276, and *Lancet*, vol. ii., 1886, p. 529; *Abstract from London Medical Recorder*.

ALBAN DORAN (London.)

IV. Extirpation of a Kidney for Phthisis Renalis. By DR. MATLAKOWSKI (Warsaw, Russia) —A peasant woman, æt. 26, was ad-

mitted to the city hospital Oct. 3, 1887; she was emaciated, could not walk, and was all the time feverish. The right leg was swollen and bent in the hip and knee joints; signs of phlebitis on the right thigh. On the right side of the abdomen there was felt a large round and smooth tumor, extending from the edges of ribs down to linea inter-spinalis, and forward, almost reaching linea alba. The tumor hardly could be moved, and was very little sensitive, and fluctuating. Urination was painless; the urine was transparent, containing no sugar or albumen. Microscope revealed a large quantity of red blood corpuscles. The patient was suffering from the chronic inflammation of lungs and profuse night perspiration. The illness began after a childbirth which took place 11 months previous to her entrance to the hospital. In her family there was no tuberculosis. The diagnosis was, tuberculosis of the right kidney, while the left one was healthy. Oct. 15, extirpation of the right kidney was performed. On having made an extraperitoneal incision in the lumbar region, the kidney was removed, though its capsule was preserved. The wound was dressed in the usual manner. The extirpated kidney, on being hardened in alcohol, was 19 cm. long, and 10.5 cm. wide. Its interior wall was caseous and degenerated, full of lymphatic cells, but no tuberculous bacilli could be found. The patient remained in hospital six weeks, and left almost cured. Her general health was greatly improved; she had no night perspiration and her temperature was normal. The wound, of the size of a palm, was well granulating. The quantity of urine was gradually increasing and reached the normal quantity. The lungs remained *in statu quo*. No stone in bladder was found.—*Gazeta Lekarska*, Nos. 1 and 2, 1888.

P. J. POPOFF (Brooklyn).

BONES, JOINTS, ORTHOPÆDIC.

I. Fracture of the Anterior Tuberosity of the Tibia.
By DR. EUGEN. MUELLER, (Tuebingen.) The author has found six such cases in medical literature, and offers two new cases, one his own and the other observed by Lauenstein. In all cases the fracture was the result of muscular action, in seven of them while jumping. In six

of these cases, the fracture occurred five times on the right side. Most frequently the active and passive tension of the quadriceps muscle causes either rupture in the substance of the muscle itself, or fracture of the patella or a rupture of the ligamentum patellæ. Regarding the formation of the anterior tuberosity of the tibia Henke says that in the newly born and even at a later period, there lies to the front of the epiphysis and the upper part of the diaphysis a thick mass of cartilage, which undergoes ossification uniting with the epiphysis. The author has always found at post-mortem investigations such bony connection between the mass of cartilage and the epiphysis in persons of 15 or 20 years, but only cartilaginous union with the diaphysis. In no specimen was there cartilaginous union with both segments of the tibia. Judging from the varying size of the fragment of the tuberosity, he thinks that the avulsion of the entire tubercle from the tibia with which it has remained in cartilaginous union, is a very rare occurrence, but rather believes that these fractures can occur at any part of it. The symptoms of these cases are similar to those of fractured patella. The form of the patella is, of course, preserved, and about two inches below the lower border, there is to be felt a small bony prominence, always movable in a lateral direction, and if the separation has been complete, also in a longitudinal direction. Effusion into the joint is most always present, and is to be explained by a simultaneous laceration of the bursa infra-glenoidalis lying beneath the patellar ligament, and separated from the joint by only a thin layer of tissue. The main point in the treatment must be the retention of the fragment in its proper place, or otherwise a serious functional disturbance will follow ligamentous union. Adhesive plaster, plaster of paris or silicate dressings will accomplish this purpose if applied in and combined with extreme extension in the knee-joint. Movements of the joint ought only to be begun six weeks after the injury. In severe cases the author recommends nailing the fragment down to the tibia, but deprecates incision of the joint to attain approximation of the fragments. Of eight cases there was bony union in six, in two ligamentous; and of the latter the uniting band was short and tense and after some time the function of the joint was normal. In

the other, there was formed a long and loose ligament and the use of the limb was materially impaired.—*Beitrage zur klinischen Chirurgie Mittheilungen aus der chirurg. Klinik zu Tuebingen*, Bd. iii, hft 2.

FRED. KAMMERER (New York.)

II. The Treatment of Joint Inflammations by Irrigations and Injections. By DR. WILHELM HAGER, (Hamburg) The author describes the method of Rinne in various inflammatory joint affections, the method of tapping being by means of an ordinary trocar. The fluids preferred for injection after puncture are either 5% carbolic acid or corrosive sublimate 1 in 1000, the latter being especially effective in the hands of Schede (Hamburg) in the treatment of purulent, infectious or metastatic joint affections.

The method employed in all cases consisted in first relieving the joint of its exudate by means of trocar and canula, the above fluids being subsequently injected. One hundred cases of simple hydrops genu are recorded operated upon in cases from one week to ten years duration; carbolic 5% used; recovery in all cases except a case of tuberculosis of the lungs; no relapses observed.

Nine cases of hæmarthros. genu were punctured and washed out. Of eight cases of acute primary suppuration of the knee or elbow joint four were discharged cured, two being discharged by request in splint, and one case died of delirium tremens. Here incision and drainage became necessary.

In secondary so-called metastatic inflammations of the joints the results are not so favorable as in simple synovitis; in recent cases a good result may be obtained. Where a periarticular abscess has compromised the joint capsule and caused panarthrits, incision and drainage give the only chance of recovery. The result of irrigation with 3% or 5% carbolic was favorable also in four cases of acute suppurative arthritis, following the acute infectious diseases. Nine cases of gonorrhœal inflammation of the joints in which the exudate was either serous or purulent, were treated by irrigation. In five the result obtained was almost a complete normal movement of the joint. In four cases the joint motion was normal after operation. In several cases of the periarticular inflammatory form of gonorrhœal affection the results

were less satisfactory. Those cases where ankylosis was threatened the author thinks were benefited by the above treatment. Twelve cases of simple joint exudate remaining after acute articular rheumatism were treated by irrigation (3% carbolic). In these cases the knee was the seat of the disease 13 times, the elbow once, giving a total 14. In nine patients a good result was obtained, and in three almost normal joint motion resulted. The main obstacle in these cases is the periarticular tissue-infiltration which necessitates subsequent massage etc. In purulent exudates after polyarthritides rheumatica (3 cases) the results were favorable, though here we have to contend with a form of joint affection destructive to the cartilages in its tendencies. In none of the cases recorded, however, did the author incise or drain. The results of this mode of treatment were found favorable in synovial suppuration following osteomyelitis of the epiphysis. In syphilitic joint disease the results were encouraging. In 30 cases of tubercular joints the joint-irrigations gave favorable results; improvement in 14 cases. Hueter's injections were used in 14 cases. *Zeitschrift f. Chir.*, Bd. xxvii, heft 1 and 2.

III. Contributions to the Resection and Osteotomy of Ankylosed Joints. By TH. KOLLIKER. (1) In cases of tuberculous coxitis, the author operates with Langenbeck's posterior incision: the trochanter is exposed with the raspatorium and resection knife. The acetabulum should be laid bare and thus any latent processes, osteomyelitis or tuberculosis may be exposed. If tuberculous coxitis exist the cavity of the wound after operation is best filled with iodoform or sublimate gauze. If the diseased process in the bone has long ceased then the continuous suture and drainage are indicated. The after treatment consists in extension for three to six weeks. The patient should carry an extension splint for a year. In bony ankylosis the resection with the chisel is indicated. (Volkman).

(2) In ankylosis at the knee joint (faulty position) the joint is best exposed by a curved incision beneath the patella. After division of the ligamentum patellæ proprium, a flap including the patella is formed and reflected upward, and the condyles of the femur are sawn through

with a circular saw. The tibia is freshened by superficial section. If the patella can be retained, its surface may be cut and applied to the resected bones. Or, it may be extirpated. The ligamentum patellæ and capsule are sutured with deep, continuous catgut suture. A drain is placed corresponding at each side to the space between the bones, and another through an opening at the extremity of the bursa extensoria. The Esmarch bandage is removed after the extremity is put up in splint.—*Deutsche Zeitschr f. Chir.* Bd. xxiv, heft 5 and 6.

IV. The Discussion and Therapy of Genu Valgum, and Varum. By Dr. G. MIDDELDORF (Wurzburg). The author records 30 operations, occurring in the surgical clinic of Prof. Maas. These operations were performed upon 23 patients, ranging from three to twenty years of age. The operations were for the removal of genu valgum (28) and genu varum (2). In 16 cases the deformity was unilateral and six times bilateral. Rachitis was an etiological factor in four cases (3, 5 and 17 years of age respectively). In the rachitic form of the disease, the bloody operation, as a rule, was performed. Genu valgum staticum occurred in 13 patients ages varying from 15 to 22 years. Two cases of congenital patella luxations were aged 26 and 11 years when operated upon. Of the above cases 19 were males. The patients with genu valgum adolescens were bakers (3), locksmiths (3), merchants (2), cabinet makers, type setters, mechanics and servants. Esmarch's bandage was used in most cases. The author notes the use by Maas of the ordinary chisel and wooden mallet in wedge-shaped osteotomy. Mc-cawen's osteotome is used in the linear osteotomy. In double (bilateral) deformity the operation should be performed in one sitting. In operations on the tibia and fibula Maas operates according to Schede with a somewhat modified technique. After making an **H** or **+** shaped incision in the periosteum over the tibia he cuts out (chisels) a wedge shaped piece not extending through the whole thickness of the shaft. The base of the wedge varies with the age of the patient and the amount of deformity. The fibula is then chiseled through. The periosteum of the tibia is sewed with catgut, the wound cleaned

with acetate of aluminum sol., and the whole dressed with protective and a permanent dressing of 5% sublimate and iodic chloride glycerine gauze. The extremity is fixed and suspended for hours. After application of stiff bandage over the splints, the Esmarch's bandage is loosened. In no case was subsequent hæmorrhage observed. Drainage is superfluous.

The author then discusses the osteotomies about the knee joint including Macewen's operation.—*Deutsche Zeitschr f. Chir.* Bd. xxiv, heft. 1 and 2.

HENRY KOPLIK (New York)

V. Recurrent Sarcoma in Clavicle; Excision of Clavicle; Death from Secondary Growth in Brain. By CHRISTOPHER HEATH (London.) The patient, aged thirty, stated on admission that about four years ago he had had a tumor removed from the tissues over the outer part of his left clavicle, and this growth had been present twelve months before its removal. There was no recurrence of the disease until about three months ago, when he fell and sustained a fracture of his left clavicle, soon after which a swelling of this bone was noticed. On examination the scar three inches and a half long was situated over the outer part of the clavicle. The bone was broken about the middle, and the inner end of the outer fragment was displaced inwards behind the outer end of the inner fragment. Surrounding the broken ends there was a soft solid growth, measuring one inch and a half in diameter; distinct expansile pulsation could be felt in it. No enlarged glands could be found nor signs of internal recurrence. The sixth day after admission Heath made an incision along the entire length of the clavicle, and divided the attachments of the muscles to the bone. The anterior part of the capsule of the sterno-clavicular joint was divided with the knife and the posterior part was torn through with a periosteal elevator; the sternal end of the bone was then pried up and the rhomboid ligament divided with a scalpel; the sternal end of the bone was then wrenched forwards and torn free from the subjacent tissues; the acromial end was easily separated from the adjacent tissues, disarticulated and removed. During the latter part of the operation the transverse cervical and suprascapular arteries were

exposed and the former wounded. A double ligature was applied—the wound was dusted over with iodoform, sutured, drained from the outer angle, and dressed with iodoform wool—a pad of wool was placed in the axilla, and the arm was bandaged to the chest. Except at its extremities the clavicle was infiltrated with sarcomatous growth which was composed of a mixture of round and spindle shaped cells. The wound was dressed on the second, fifth and seventh days after the operation. But the patient remained in a drowsy state which gradually passed into coma. On the ninth day after the operation, well marked optic neuritis of both eyes was detected; and a secondary growth in the brain was diagnosed. Subsequently both pupils became dilated and inactive to light; paralgisia supervened, and on the eleventh day after the operation the patient died.

On post mortem examination the wound was soundly healed and quite dry. There was distinct bulging towards the middle line of the inner surface of the right frontal lobe, and on section a round mass of growth about the size of a walnut was found in the white substance of the frontal lobe. No other growths in the brain could be found. There was a secondary sarcomatous deposit in the apex of the left lung close beneath the clavicle; there was also another mass at the base, a third at the foot, and other scattered patches. In the right lung there was a number of small deposits varying in size from a pea to a Barcelona nut. The other organs were healthy.—*Lancet*, April 14, 1888.

H. PERCY DUNN (London.)

VI. Arthrectomy. By H. H. CLUTTON, F.R.C.S. (London.) Mr. Clutton urges that the operation should be done directly it is found that treatment by apparatus to keep the joint absolutely at rest has failed. If thus done at an early period the disease will not be too advanced and an excision thus rendered unnecessary. He considers that it cuts short the disease, and the patient makes a much more rapid recovery. No attempt should be made to obtain a movable joint. As to the method of operating, he says, “the joint being widely opened all the synovial membrane which is obviously diseased is removed with scissors or scalpel. If only a sharp spoon were used, the diseased parts could not be thoroughly taken away, for the *surface* alone is soft

enough to be removed by this instrument. As a general rule there is a very distinct interval between the gelatinous synovial membrane and the capsule which serves as a guide to the operator during this dissection. The capsule and fibrous tissue surrounding the joint is retained, so that it may again be united after the operation is completed. When the larger masses have been removed in this way with scissors, the margin of the articulation itself is treated and here it will be found that the sharp spoon is invaluable, as it loosens the attachment of the synovial membrane to the bone and cartilage, and enables the operator subsequently to apply the scissors with effect. Each ligament is in turn now examined, and the parts behind and under cover thoroughly scraped out; but unless the ligament has been seriously softened, and thereby rendered useless, it is carefully preserved.

The articular cartilage is next examined; if it feels solid and firmly attached to the bone beneath, it is not removed, but any opening or deficiency is enlarged. The gouge or sharp spoon can then remove as much of the softened area as is thought desirable. When the cartilage on the other hand, is found loosely attached over the greater part of the surface of the joint, it is all easily scraped off and removed. "In speaking of the operation on special joints Mr. Clutton makes a few suggestions. In the knee instead of the old curved incision through the ligamentum patellæ or a vertical incision and dividing the patellæ, he makes "a long curved incision through the extensor tendon just above the patella and prolonged downwards on each side to the line of articulation. The patella is then reflected downwards." A drainage tube should always be passed through the popliteal space between the two popliteal nerves. If the joint is found to be very movable two ivory pegs may be driven up from each head of the tibia into the corresponding condyle of the femur, a passage for them having been first drilled. In two cases in which he performed this operation on the ankle he found it necessary to make four incisions, namely, one in front and one behind each malleolus.

H. H. TAYLOR (London).

REVIEWS OF BOOKS.

DES CYSTITES DOULOUREUSES ET DE LEUR TRAITEMENT. Par le DR.
H. HARTMANN, Paris. 1888.

ON PAINFUL CYSTITIS AND ITS TREATMENT.

American and English surgeons have of late years advanced more rapidly in the direction of operative treatment of chronic cystitis than their French and German confrères. M. Hartmann's work is not only an attempt to popularize perineal drainage, etc., as a means of curing these most troublesome cases, but is a valuable review of the whole subject. Its thoroughness may be judged from the fact that full details are given of nearly thirty cases of operative interference under the writer's own observation. Starting with the thesis that in some cases of cystitis (gonorrheal, tubercular, prostatic, etc., in origin) the pain and irritability of the bladder are so great, so persistent, and so little affected by ordinary treatment as to deserve their being placed in a special category, the author points out how the sensitiveness of the bladder may be estimated by various methods of exploration. Of these the most valuable are the injection of a small quantity of fluid into the bladder, digital pressure through the rectum in males or (what is much more satisfactory) through the vagina in females, and the use of an olivary bougie passed so that its end may touch the posterior wall of the bladder.

The hypertrophy of the vesical muscle in these severe cases may be so great that the wall has been found one-and-a-half inches thick, and in many sclerosis is present in addition to the increase in the muscle.

Simple neuralgia of the bladder may simulate painful cystitis, but is readily told by the normal state of the urine, and the methods of exploration mentioned will enable the surgeon to diagnose the cases of irritable bladder due to renal disease from those which form the subject of the work.

As regards the medical treatment a good way of relieving the pain and irritability is to inject per rectum thirty or forty grains of choral dissolved in milk. This with the addition of a little laudanum is a fa-

vorite prescription of M. Guyon, the milk preventing any irritant effects upon the mucous membrane. In the cases of urethritis posterior accompanied by painful cystitis, almost the only vesical injection which this surgeon finds of avail is one of nitrate of silver (fifteen to twenty drops of a solution of 1 in 50).

M. Hartmann reviews the treatment of painful cystitis in women by dilatation of the urethra, and gives a table of forty-six cases, including six previously unpublished. In thirty-one of these the result was either a cure or great relief of symptoms. Full details are also given of twenty-eight cases of the artificial formation of a vesico-vaginal fistula (kolpocystotomy). For the results as well as for those of cystotomy in the male, the reader must be referred to M. Hartmann's work, no less than seventy-one cases of the latter operation are quoted. It may here, however, be noted that the writer, following M. Guyon, advocates the supra-pubic incision in preference to the perineal one so strongly supported by Sir H. Thompson. In some cases where the irritability and firm contraction of the bladder persist under an anæsthetic, it is however impracticable to perform the hypogastric section. The great advantage of the latter in enabling the surgeon to explore the bladder and to treat locally its lesions are obvious.

We can warmly recommend the surgeon interested in the subject of "painful cystitis" to read M. Hartmann's careful and candid work.

J. HUTCHINSON JUN.

MANUEL D'ANTISEPSIE CHIRURGICALE. Par le DR. PAUL TROISFONTAINE, Paris, G. Steinheil, 2 rue Casimir Delavigne, 1888.

MANUAL OF SURGICAL ANTISEPSIS. By DR. PAUL TROISFONTAINES. Senior Assistant at the University of Liège. Assistant Surgeon to the Civil Hospitals. 8 vo., pp. 262 with 17 illustrations.

This is a very good little book, and would be valued by any house-surgeon, dresser or practitioner who reads French. It is essentially practical and is intended to be a handy guide for everyday use. The author has had good opportunities of mastering his subject, having been "chef de clinique" of Prof. Gussenbauer (now of Prague), and during six years assistant to Prof. von Winiwarter.

The essential points respecting antiseptic materials and practice are given both concisely and clearly. The proper use of each different antiseptic is indicated, *e. g.*, how this does best for disinfecting the

hands, that for the instruments and how one substance is most valuable in ophthalmic and another in obstetric practice.

The second part of the work deals with the antiseptic management of special lesions such as compound fracture, osteotomies, herniotomies, abscesses, erysipelas, etc.

An appendix of eight pages treats briefly of obstetric antisepsis.

C. B. KEETLEY.

TRANSACTIONS OF THE ACADEMY OF MEDICINE IN IRELAND, Vol. V., 1887. Dublin; Fannin & Co.; London, Bailliere, Tindall & Co.; Edinburgh, Maclachlan & Stewart.

The present volume, we suppose, is the last which will appear under the old title of the Academy of Medicine in Ireland. For since the termination of the session 1886-1887, the euphonious prefix "Royal" has been secured, and in future we shall have to deal with the Transactions of the Royal Academy of Medicine in Ireland. Like its predecessors, the volume before us is a bulky tome, consisting of 367 pages, which include only a selection of the papers which have been read before the various sections during the session 1886-1887. The papers which have been chosen to form the surgical section are valuable and interesting both on account of their practical character, as well as of the important subjects with which they deal. Mr. Wheeler contributes a very useful paper on the "Conservative Surgery of the Foot and Ankle-joint," which is inclusive of the records of several cases in which he has practiced excision of the os calcis and astragalus for caries of the bones in question.

Referring to the subperiosteal method of excising the os calcis he observes that he does not believe in the advantages claimed for it, while it has in his opinion many disadvantages; moreover, the periosteum is often diseased, and does not after operations always carry out its wonted functions. The case of trephining of the mastoid process, by Mr. Fitzgibbon, which excited so much discussion in the Medical Press and Circular at the time it was read before the Academy is published in full, and is a useful contribution to the subject of brain surgery.

In a paper on "Pylorus Resection" by Mr. McArdle, we learn that in more than 50 per cent. of all the cases of cancer of the stomach, of which the author has been able to collect the records, the disease was confined to the pylorus—the whole subject of the operative treatment of cancer of the stomach is here ably discussed, and a full de-

scription is given of the various details to be followed, and precautions to be observed, in the operation of resection of the pylorus.

Mr. J. K. Barton records a case of *Cesophagotomy to Remove a Foreign Body*: the foreign body was a steel roller, belonging to a sewing machine, and the patient was a child. Where primary union does not occur in the *oesophagus* after operation, the author deems it to be the best plan to feed the patient—not through the mouth—but through the wound by the means of a catheter or india-rubber tube. Mr. Kendal Franks contributes a paper on “*Nephrolithotomy*,” and Mr. Thornley Stoker one upon “*Some Elements of Success in Excision of the Knee-Joint*.” The three factors of superlative importance in these cases he considers to be (1) complete removal of all diseased structures; (2) relative permanence of dressings; (3) thorough fixation of parts. An interesting case of sarcoma of the tonsil is recorded, with remarks by Mr. H. G. Croly. The concluding paper of the surgical section is on the “*Contrast between Laparo-Colotomy and Lumbar Colotomy*” by Dr. C. B. Ball. There are several of surgical interest in the pathological section, and notably one by Mr. H. Q. Swanzy on “*A Case of Fibro Sarcoma of the Orbit*,” on “*Trephining in Epilepsy*” by Mr. Wheeler, and one by Dr. Bennett, on “*Fracture of the Ischium*.” The illustrations throughout the volume are well done, and there is evidence everywhere of careful editing.

THE PRINCIPLES OF CANCER AND TUMOUR FORMATION. By W. ROGER WILLIAMS, F.R.C.S. London, John Bale & Sons, 1888.

This volume of 196 pages is intended, in the words of the author as “*An Introduction to a Contemplated Treatise on the Pathology and Treatment of Cancer and Tumor Formation, of which it forms the first part*.” In the chapter on reproduction the author states, “*I have arrived at the important conclusion that the processes of repair and reproduction of lost parts, and the various morphological variations, including bud cancer and tumor formations, are nothing but more or less abortive attempts of certain cells to reproduce new individuals—whence it follows that the laws of reproduction are also the laws of cancer and tumor formation*.” Chapters follow on “*The Evolution of Vegetable Neoplasms*,” and on “*The Evolution of Animal Neoplasms*,” in which the leading idea embodied in the quotation above given is worked upon. In the latter chapter, the theory that cancer is a blood disease is refuted, and the author expresses his consonance with the views of De Mojan that a tumor from the first is a

living self-dependent formation, capable of continual growth by virtue of its own power of using the nutritive materials supplied to it.

The book is an honest and for the most part, praiseworthy attempt to throw light upon the subject with which it deals. It contains many interesting details in regard to vegetable pathology, to the study of which of late more attention has been directed, and of this subject the author exhibits throughout his pages a considerable knowledge.

H. P. DUNN.

TRANSACTIONS OF THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY OF LONDON. 1887. Vol. 70.

This volume is quite up to the level of its predecessors in surgical interest. Perhaps the most important of its contents are a series of three papers on the treatment of aortic aneurism by the introduction of wire into the sac. Also in relation to aneurism is a paper by Messrs. John Langton and Anthony Bowlby entitled "A Case of Multiple Embolism of the Arteries of the Extremities Followed by the Formation of Aneurisms with Remarks on the Relations of the Embolism to Aneurism. And, again there is a paper by Mr. Savory "On the Effect upon the Femoral Artery of its Ligature for the Cure of Popliteal Aneurism."

For convenience of reference, the individual papers of importance in this volume will be or have been dealt with in our index department rather than here.

There is also a valuable series of papers relating more or less to abdominal surgery, namely Mr. Treves' on Richter's hernia, Mr. Knowsley Thornton's "Three Hundred Additional Cases of Complete Ovariectomy and Twenty Cases of Exploratory Operation". Mr. Arthur Barker's "Case of Intussusception of the Upper End of the Rectum Due to Obstruction by a New Growth; Excision of the Intussusceptum; Suture of the Remaining Bowel; Complete Recovery." Mr. Godlee's "Case of Obstruction of One Ureter by a Calculus, accompanied by Complete Suppression of Urine." Mr. Parker's "Case of Suppression of Urine, Following Injury to a Sacculated Kidney Containing Calculi, the Other Kidney being Entirely Disorganized." And Mr. Bennett's paper on "Some Dangers Connected With the Use of the Aspirator as a Means of Relieving the Distended Urinary Bladder."

PROCEEDINGS OF THE WEST LONDON MEDICO-CHIRURGICAL SOCIETY,
Edited by H. CAMPBELL POPE and H. PERCY DUNN, 1887. London,
Balliere, Tindall & Cox.

This contains an interesting Cavendish Lecture by Mr. Jonathan Hutchinson "On the Study of Symptoms Caused by Certain Drugs," which deals especially with antimony, mercury, and arsenic. A short quotation will give an idea of the clinical facts contained in the lecture. "What I have just said leads me to speak concerning the influence of arsenic upon the nervous system in a general way. I believe that it can produce a considerable variety of curious symptoms. Numbness and tingling in the feet is one of the most common. The nerve discharges known as epilepsy are also, I feel sure, sometimes due to arsenic. A young lady now under my own care who has for many years taken arsenic on account of most obstinate psoriasis, has become, I fear, a confirmed epileptic. A late Master of the Rolls who had all his life suffered from psoriasis gave me some most interesting facts as to his own history. He could produce what he called arsenical eczema at will by a few doses of the drug. The eruption was non-symmetrical, and it was arranged in long streaks, and although looking like eczema, it was clearly more allied to herpes. It had always disappeared spontaneously. For many years my patient had avoided arsenic on account of this inconvenience. In early life under the advice of Sir Benjamin Brodie, he had taken arsenic freely for psoriasis, and had whilst under its influence, a single epileptic fit. He said he felt sure the arsenic caused the fit, for it was disagreeing with him at the time."

A considerable number of surgical cases of various kinds are reported in brief abstract in this volume.

C. B. KEETLEY.

ON TRAUMATIC SUBDURAL ABSCESS OF THE BRAIN.

By SIR WILLIAM STOKES, M.D., CH.M., UNIV. DUBL.,
F.R.C.S.I.

OF DUBLIN.

PROFESSOR OF SURGERY AT THE ROYAL COLLEGE OF SURGEONS OF IRELAND.

A REFERENCE to the statistical records of Abercrombie, Sir William Gull and Dr. Sutton, will furnish evidence that of cerebral abscesses, the traumatic forms are those which occur with the least frequency. Thus of 86 cases collected by them, only 20 resulted from injury, or less than one-fourth of the entire number. Of these the subdural are the rarest, and it is to this form that I desire particularly to invite attention.

Until comparatively recently cerebral abscess has been considered, as a rule, a necessarily fatal condition. Undoubtedly high authorities such as Abercrombie, Griesinger, Lebert and other accurate and trustworthy observers regarded them as out of the range of practical medicine, and the fact that this hitherto hopeless condition has of late to so great an extent been rescued from the confessed impotence of medicine, must be regarded as not the least among the modern triumphs of surgery. Two circumstances have doubtless conduced to bring about this desirable result; one, the greater knowledge that has been recently acquired of the localization of cerebral function, injury and disease, and the other the application of the principle of antisepticism, which deprives to so large an extent surgical operative interference, of so many of its risks and dangers. The surgeon's hands are no longer, as was formerly the case, weakened and paralyzed by the dread of meningeal or encephalic trouble resulting directly from the operation of trephining.

It must be admitted, I think, that the advantages to be derived from trephining in cases of cerebral abscess are more likely to be conspicuous than when the operation is performed for other conditions causing pressure. I allude more particularly to those cases in which it is produced by some solid tumor, or is hæmorrhagic in character. The facilities for localizing abscesses are, as a rule, greater than in these cases, and there is less risk of the subsequent occurrence of secondary complications at a period more or less remote from the time of the operation.

The cases of subdural traumatic cerebral abscess that have been operated on have been comparatively few. I have, in fact, only ascertained 11 such, operated on respectively by Dupuytren, Roux, Cæsar Hawkins, Rentz, Hulke, Sir J. Paget, Marshall, Lee, Macewen, and myself. Of these 11 cases it is interesting and encouraging to note that in five the recovery was complete, in one there was recovery, but with loss of sight and a subsequent tendency to epileptic seizures, leaving only five out of the 11 in which the operation was unattended with success.

The rarity with which the operation has been undertaken has doubtless, to a large extent, been due to the difficulties now happily diminished, of localization, and also to a lack of confidence in dealing surgically with such conditions which of late years we have obtained from a clearer and more thorough appreciation of antisepticism. In opposition to this, however, it may be said that, perhaps, the most brilliant instance on record of successful operative effort in a case of traumatic cerebral abscess occurred in the pre-antiseptic era. I allude to the case operated on by Dupuytren, whose bold interference, notwithstanding its successful issue, has been thoughtlessly described as reckless and haphazard. For example, Mr. Lawrence¹ observes in reference to cerebral abscess, that "Surgery, speaking through Sir A. Cooper and Sir B. Brodie, declares itself as impotent as medicine for the cure of such a malady, for although it is recorded that on one occasion Baron Dupuytren actually punctured the brain to the depth of an

¹Edinburgh Medical Journal, 1869.

inch, after which the patient recovered, the result must be regarded more in the light of a specially lucky chance than as constituting a precedent which would warrant a like procedure in similar circumstances." Dupuytren's operation would in truth be more fittingly described as one suggested by a surgical genius such as few, if any, have ever before or since possessed.

In connection with the subject of cerebral abscess, the two following cases, which were under my care in the Richmond Surgical Hospital, are noteworthy examples; and the details connected with them, taken with the others to which I have already alluded will, I trust, aid in arriving at some definite conclusions which possibly may guide us in our future appreciation and management of similar cases. The majority of them, I may mention in passing, are signally illustrative of the pathological fact, first noted by Dease, in reference to the usually late appearance of cerebral trouble after cranial traumas.

The first of these cases occurred in the autumn of 1859.

The patient, a strong powerfully built young man. æt. 26, was admitted into the Richmond Surgical Hospital under my care in September of that year. He had gone to the north of England during the summer, to obtain employment at harvest operations, and during a dispute with some of his fellow laborers, received a blow on the side of his head over the left temple, with a handle of a reaping hook. He was stunned by the blow, but soon recovered, and no other immediate bad consequence of the injury occurred. For some weeks after this he was able to continue his work, suffering from nothing but occasional headaches. He then returned to Ireland and shortly after landing on the quay at the North Wall, got, it was said, a "weakness." He fell and became insensible. He was then brought at once to the Richmond Hospital, and I was promptly summoned. I found the patient in a state of complete insensibility; myosis was extreme, and the pulse slow. He had retention of urine, his respiration was not stertorous, however, but the paralysis, motor and sensory, was complete. Shortly after his admission into hospital, assisted mainly by my friend the late Dr. Henry Curran, I trephined above and behind the left temple, at the situation of the cicatrix. On removing the bone there was a distinct bulging of the dura mater through the opening. I

made an incision into it, and evacuated about a drachm of clear straw-colored serous fluid. There was no appearance, however, of pus, which was, I need hardly say, a source of great disappointment to me. It was remarkable, however, that even the relief from pressure obtained by the trephining and evacuating of a small amount of serous fluid was sufficient to restore a certain amount of sensibility, as was evidenced on touching the conjunctiva. The operative measures I adopted in this case did not go any further, and the patient was removed to bed. The following day he died. At the autopsy an abscess containing fully two and a half or three ounces of healthy cream colored pus, and lying directly under the dura mater was found situated immediately behind the situation where I trephined. Had I gone the twentieth of an inch further back I should unquestionably have opened the abscess.

This case, I need hardly observe, occurred in the pre-antiseptic and pre-aspiration era, and I had not the confidence that the one, and the assistance that the other now affords; but persuaded as I was that I had to deal with a case of intracranial suppuration, it will ever be a source of regret to me that I desisted from the course to which I was instinctively prompted; viz., to make a second, or if necessary, a third trephine opening. All the probabilities are that had I done so the matter would have been reached and the patient's life possibly, indeed probably saved.

In the following case the operation of trephining was attended with a more satisfactory result.

John Brophy, æt. 24, by occupation a wall plasterer, was admitted into the Richmond Surgical Hospital on July 29, 1887. At the time of his admission he was in a heavy drowsy condition. Between six and seven weeks before his admission into hospital he was, on a Saturday night, during a dispute with some companions, struck on the head with a poker. For a small scalp wound, which apparently was the only injury which resulted from the blow, he went to Jervis Street Hospital where the wound was dressed. The patient was not detained in hospital, and on the following Monday morning went to work as usual. He continued at his employment continuously until July 17, but for some days before this his appetite had been failing and he had been feeling rather sick and drowsy. He complained also of dizziness. On the night of the 17th, he was attacked with vomiting, which continued off and on

for a week. Shortly after this it was observed that he had considerable difficulty in speaking and making himself understood. He was admitted into hospital on July 29th; and his condition then was as follows: There was a small wound not quite healed at the upper part of the forehead about an inch to the left side of the mesial line. On passing a probe into this, denuded bone could be felt and apparently a slight depression. The patient was extremely drowsy, and when sitting down at once fell asleep, but could be roused by being spoken to in a loud voice. He answered, however, only in monosyllables and could make no attempt at describing either what had happened to him or what he was suffering from. His pulse was 42. Respiration and temperature were normal, pupils even but contracted. On the 31st, his condition was much worse; he could only be roused with the greatest difficulty, his water was passed involuntarily, and paralysis in the extremities, both of motion and sensation was well marked; his breathing, however, still remained normal, no evidence of stertor being in the slightest degree present. Power of deglutition, too, was found at this time to be lost, and as the day wore on, the stupor from which it was found perfectly impossible to rouse him, became more intense. At 2 o'clock P. M., he got a convulsive seizure confined to the right side; the leg and arm were rigidly extended, and the hand strongly clenched with the thumb turned under the fingers. These convulsive seizures lasted about three minutes, during which the pulse rose from 40 to 100, and the respirations became rapid, reaching 30 in the minute, the pupils contracted to pin's points, the cornea perfectly insensible and the forehead bathed in perspiration. On the convulsion ceasing, it was found that it could be re-induced by tickling the soles of the feet, an experiment which was in consequence not repeated.

The case was clearly *in extremis*, and although I considered the chance of relieving the patient by operation was, under the circumstances, a remote one, I deemed it possible that relief might be afforded by trephining and that the operation should be performed without delay. In this view I was strengthened by the coinciding opinions of my colleagues, Drs. Thomson and Corley, who examined the case with me and subsequently assisted at the operation.

At 5.30 P. M., I operated, and on raising a triangular flap of pericranium over the situation of the wound I found that there was no fracture with depression, but, a small piece of the outer table of the bone was necrosed and completely detached. This acting as a foreign body and source of irritation, had doubtless prevented the external wound from closing.

Having removed the detached fragment, I next applied the crown of a trephine so as to include the situation where the loosened piece of bone had been found. On raising the bone and exposing the dura mater no evidence of abscess was found. Feeling confident, however, I could not be far from the source of pressure, I punctured the dura mater with the needle of a hypodermic syringe and passed it down for about the eighth of an inch, and on drawing up the piston of the instrument experienced disappointment at getting a negative result. I then passed the needle still deeper and again failed to reach the matter. I was about to withdraw the instrument and abandon my efforts to relieve the patient, when, strengthened by the concurrence of my colleagues, I sank the needle down as far as it could go. On drawing up the piston once more I gladly perceived a few drops of pus in the glass receiver. I then freely opened the dura mater, and using the needle as my guide, I passed the blade of a narrow bladed bistoury down to the abscess, some of the contents of which soon appeared at the surface of the wound. Acting on Dr. Thomson's suggestion, I got a piece of india rubber tubing, and passed one end down to the abscess, and attaching the other to the nozzle of a medium sized glass syringe, I succeeded in drawing or pumping up a quantity of dark colored grumous pus. Of this I obtained one ounce and two drachms. I then filled a glass syringe with a one per cent solution of carbolic acid and thoroughly washed out the abscess cavity, removing subsequently the carbolic solution by drawing it up in the way I had done with the pus. A drainage tube being then left in, I replaced the flap uniting the edges with numerous catgut sutures, and dressed the wound with sal-alembroth gauze and iodoform wool.

As regards the situation of the trephine opening, I may mention that it was three quarters of an inch to the left of the mesial line, and one inch in front of the coronal suture. It corresponded to a point between the supero- and meso-frontal convolutions. In order to ascertain the size and direction of the abscess cavity, I passed my left little finger into it, I could determine its limitation anteriorly, laterally and inferiorly. Externally and inferiorly its limitation must have been formed by Broca's lobe, but posteriorly and inferiorly, although I passed my little finger as far as possible, its limit was not reached, and my belief, one shared in by Professor Cunningham, is that the abscess possibly involved the lateral ventricle.

The beneficial effects of the operation were almost immediate. His pulse from being 40 per minute, rose to 120. He opened his eyes and looked about intelligently. After the wound was dressed he made an at

tempt to speak, and when asked if he felt better, answered with tolerable distinctness, "Yes." In about half an hour I removed the patient to his ward, and for some hours he remained on his back quite quiet, the only disturbance being to make him take from time to time some warm milk which we found him able to swallow without difficulty. Toward evening he turned on his side of his own accord and fell into a quiet sleep. In this condition I found him on making my visit between 9 and 10 P. M.

The next morning the patient was able to talk quite clearly and rationally. He passed water of his own accord. I dressed the wound but did not remove the drainage tube. The patient's condition was in every way most satisfactory. On the day following, there being no discharge through the dressings, and the pulse and temperature being all that I could desire, I left the dressings undisturbed. The patient's bowels moved quite naturally. From this time the progress of the case toward recovery was uninterrupted. On Aug. 6, I removed the drainage tube, the wound except at the point where the tube had been, being completely healed.

On Aug. 13, the patient was up and able to walk about the ward free from all pain and feeling quite strong. Shortly after this I transferred him to the "House of Rest" at Merrion where he remained for five weeks; at the end of which time he was able to return to his usual avocation. The final outcome of this remarkable case, if disappointing, is of much interest. For nearly nine months after the operation the patient remained perfectly well, and quite able to follow his usual occupation as a wall plasterer. It was then stated that he got a "fit," from which he recovered, and he returned the following day to his work. The morning after this he was found in bed in a state of complete insensibility, and he was then brought for the second time to hospital. Right hemiplegia was complete, and both plantar and patellar reflexes lost; his face was pale, but lips deeply cyanosed. Pulse, 160; respirations, 60; temperature, 101.8°. He had frequent convulsive seizures after he came to hospital.

Thinking it possible that these symptoms might be due to the formation of a second abscess, I reflected the flap I had made originally at the trephining operation, and, on opening the dura mater through some thickened cicatricial tissue gave exit to a quantity of bloody serum; I then passed a blunt-pointed director downward and backward to a distance of 5 cm., but did not reach any pus or other fluid. A director was then passed downward and slightly forward, when a considerable quantity of serous fluid came gushing out. From this situation I removed six

drachms of sero-sanguineous fluid dotted with white colored flakes, The effect of the operation was to reduce the pulse from 150 to 100, and the temperature from 105.1° to 104.6° . The patient, however, never rallied, and died the day following.

Before attempting to draw any conclusions in reference to the signs and symptoms of traumatic cerebral abscess, it would be desirable to take a survey which must necessarily be a very rapid one of the other similar cases to which I have already alluded. The first of these I would mention is the well known case described by Dupuytren; one remarkable in many ways, but more particularly from the great and exceptional length of time that elapsed between the receipt of the injury and the development of signs of cerebral pressure.

The patient was a young man who was struck on the top of his head with a knife which broke and a portion of it remained in the perforating wound. This healed and all went on well for several years, save some occasional pains about the scar. Symptoms of compression suddenly supervened, and he was brought into hospital in a state of stupefaction.

Dupuytren ascertained the existence of the foreign body under the scar and trephined, but without relief. The dura mater was then opened, a deep incision made, and the contents of a large abscess evacuated. This brilliant operation was followed by complete recovery.

In reference to the great length of time that in Dupuytren's case elapsed between the receipt of the injury and the symptoms of brain pressure from abscess, I may mention that another case, one however, which was not operated on, has been recorded by Mr. Lawrence, in which the injury of the head preceded the death of his patient from abscess in the brain, by almost five years.

M. Roux published a case in which after trephining he opened the dura mater but with a negative result. He proceeded no further, and the patient died. The autopsy revealed a large abscess below and behind the spot trephined, immediately under the cortical substances of the brain.

Mr. Cæsar Hawkins has also recorded an instance of subdural cerebral abscess in which the symptoms did not manifest

themselves until a month had passed from the date of the injury. After trephining, the dura mater was found in a sloughy state, and a large opening in it, through which escaped a quantity of matter. The patient died five days after the operation, and an abscess was found on the back part of the left hemisphere reaching down to the left ventricle into which it had nearly opened.

A case of cerebral abscess resulting from a gunshot injury is recorded¹ by Drs. C. Fenger and E. W. Lee, of Chicago. The ball did not penetrate the cranium but fractured the margin of the orbit and passed upwards and outwards for 2 cm. Here it lodged and was cut down upon and extracted. In a *precis* of the paper by my colleague, Dr. Thomson,² it is stated that in 40 hours, the patient had intense headache and pain in the orbit, he vomited, had some exophthalmos and there was loss of vision. The fracture was then exposed, some bone removed, and a small abscess in the orbit evacuated. A month after the injury he was able to leave the house, but he soon felt faint, and had to return home. A day later he became drowsy with a pulse of 54, and finally comatose. The temperature was normal. There was no paralysis.

In this case trephining was performed, the dura mater opened and a succession of punctures made in different directions and of varying depths before the matter was discovered. It was found at a depth of $2\frac{1}{2}$ inches. About $1\frac{1}{2}$ oz. of pus was withdrawn. A week subsequently the patient again became comatose and the operation was repeated; this time the needle was inserted to a depth of fully three inches, when a small quantity, about half a teaspoonful of thick yellow pus, was removed. In seven weeks from this time he resumed his duty as a policeman. Some months later, in July and again in December, he had epileptic seizures, but it was not stated whether he remained liable to these subsequently.

A remarkable, and, as far as I can ascertain, the first case in which exploration and aspiration were employed in dealing with cerebral abscesses, was a case published by Rentz, noted

¹American Journal of the Medical Sciences, July, 1884.

²Dublin Journal of Medical Sciences, 1884.

in Fenger and Lee's paper,¹ in which aspiration was performed in a case of cerebral abscess, twice daily, for a period of 12 weeks, with complete ultimate recovery.

The abscess was the result of a punctured wound, inflicted with a knife, which, as in Dupuytren's case, broke, and the point was left impacted in the tissues. The wound was over the right frontal region. Eleven days subsequently to the receipt of the wound, symptoms of cerebral pressure having set in, the wound was reopened and the point of the knife was extracted. This was followed by the escape of fetid matter. In this case, trephining was not had recourse to, but the abscess was evacuated by aspiration through the wound, the operation being performed twice daily, this treatment continuing for the protracted period of twelve weeks. The result in this case was in every way satisfactory. There was no definite proof that the abscess was subdural, but, from the account given by Rentz, he was obviously of opinion that the abscess was one involving the brain substance.

For the purpose of exploration Rentz has recommended blunt pointed needles as being less likely to injure the blood vessels during their passage through brain tissue. The suggestion is, I think, a sound one, and deserving of adoption.

Dr. Macewen, of Glasgow, has had considerable experience in cerebral abscesses, having seen ten cases, of which six were operated on. Of these three recovered, only one of which, however, had a distinctly traumatic origin. The particulars of this case have not as yet been published,² but, Mr. Macewen states that the cerebral abscess showed itself a fortnight subsequently to the receipt of the injury, and was attended with the usual signs indicative of brain pressure. It was not situated below the wound, and its presence and position in the brain had to be determined by the exhibited symptoms.

In the *Medico-Chirurgical Transactions* for 1879, Mr. Hulke has published a case of traumatic cerebral abscess. The patient was an errand boy, aged 15, who, hurrying out of a factory, stumbled against an iron fence, by which his forehead

¹American Journal of Medical Science, July, 1884.

²They will be found in the Editorial Department of the present number of the *ANNALS OF SURGERY*.

was grazed. He was stunned, but soon recovered. For a month he remained at his employment, and then began to be troubled with nausea and soon after to vomit occasionally. On admission into hospital 5 weeks after this injury, the symptoms were considered indicative of intra-cranial inflammation. The following day incomplete hemiplegia was observed, and this, with the other symptoms present, enabled Mr. Hulke to diagnose cerebral abscess. Trephining was performed; and a fine trochar pushed through the membranes into the brain. When at a depth of about an inch some thin greenish pus rose into the syringe. A free opening was then made with a narrow knife along the trochar, and a considerable quantity of pus evacuated. The hemiplegia and retching ceased immediately after the evacuation of the abscess. Although the boy's life was unquestionably saved by this operation, still the result of it cannot be said to have been satisfactory, for ultimately the patient became blind and subject to epileptic seizures.

Sir James Paget¹ and Mr. Marshall,² have each published a case of traumatic cerebral abscess, in which they performed the operation of trephining. The result, however, in neither case was satisfactory, owing, doubtless to the fact that the former was one of multiple cerebral abscess, and the other one of extensive meningeal inflammation and diffuse suppuration.

Among the points in these cases which are of special interest, and deserving of consideration are first the etiology of such cerebral abscesses, and also the remarkable latency of the symptoms usually connected with them. The two cases I have recorded in this communication do not, owing doubtless to the paralysis in both cases having been so profound, throw much light on the subject of the localization of cerebral function, a subject which at present is so largely exercising the surgical mind. As regards their etiology, we must, I think, accept the views held by my late colleague, Prof. McDowel, and also Sir William Gull, namely that the traumatic forms of these abscesses are mainly due to a primary phlebitic condition of the veins of the diploe, which vessels, from their in-

¹Medical Times and Gazette, 1860.

²Lancet, 1857.

traosseous position are specially prone to absorb fluids, and that as results of this, death of portions of the cranial wall occurs, and ultimately cerebral abscess.

The symptoms connected with this condition must necessarily vary much. In the first place they depend largely on the locality in which the abscesses form. Thus it has been pointed out by Huguenin¹ whose remarks are quoted by Dr. J. Burney Yeo in his valuable paper on this subject², that when the abscess occurs in the temporal lobes "that the difficulty of diagnosis is increased by the circumstance that no bands of fibres which are direct conductors of sensibility or motion pass through this lobe." An abscess, therefore, may attain a considerable size and may cause general symptoms of compression before any distinct symptoms of disease arouse the suspicion of a localized affection of the brain; and for this reason the acute abscesses belonging to this category in the great majority of cases have not been positively diagnosed.

The latency of the symptoms may be due, therefore, to the occurrence of the abscess in particular situation, or to the brain being able to endure up to a certain point an amount of pressure, when slowly and gradually applied, which when suddenly received, as in the case of hæmorrhage or bone depression, it cannot tolerate. It seems to be analogous to what occurs in the spinal cord in cases of vertebral caries, and spinal fracture or diastasis. In the former the cord becomes, if I might so express it, acclimatized to the pressure it sustains, consequent on the great and, at times, grotesque alterations in the shape of the column, resulting from caries of the bodies of the vertebræ. In the case of fracture or displacement, however, even when the pressure on the cord is slight, but suddenly produced, the symptoms of paralysis are promptly and distinctly manifested.

From the foregoing observations and cases which I have adduced, the following propositions may, I think be stated:

1. That after the primary symptoms of cerebral traumatism have subsided, there is frequently a latent period of varying

¹Ziemssen's *Cyclopædia*, Vol. XII.

²British Medical Journal, 1879.

length, during which there are no distinct brain symptoms connected with abscess formation whatever.

2. That their appearance is as a rule sudden, and if uninterfered with, they run a rapidly fatal course.

3. That the occurrence of pus production resulting from cerebral traumatism is not incompatible with a perfectly apyrexial condition.

4. That this latter fact will probably aid in differentiating traumatic cerebral abscess from meningeal or encephalic inflammation.

5. That both as regards color and consistence there is great variety in the contents of cerebral abscess cavities, and that as shown in Wilm's case, published by Rose, of Berlin, they may become transparent.

6. That antisepticism has largely diminished the risks of the operation of trephining.

7. That having regard to the great mortality of cases of cerebral abscess when uninterfered with, viz., from 90 to 100% that the operation is indicated even when the patient is in extremis.

8. That in the case where the trephine opening does not correspond to the situation of the abscess, exploratory puncture and aspiration may be employed.

9. That by the adoption of this measure the necessity for multiple trephine openings can be largely obviated.

10. That the employment of a blunt pointed aspirating needle as suggested by Rentz, is probably the safest mode of exploration and evacuation.

11. That drainage is desirable in the after treatment of such cases.

12. That both during and subsequent to operative interference in these cases a rigid antisepticism is imperatively required.

EXTENSIVE THORACOTOMY FOR SARCOMA OF THE CHEST-WALL WITH ADHESIONS TO THE LUNG.

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FRANK COMSTOCK, æt. 33, from Machias, N. Y. Patient's family history good. Twenty years ago, he noticed a little nodule, no larger than a pea, about the middle of the outer aspect of his left leg, where he had previously bruised it. This enlarged very slowly until five years ago, when it began growing more rapidly. Seven months ago, Dr. King, of Machias, diagnosed a sarcoma, and removed it. Since then it has returned its old site. Early in February, of 1887, he consulted me by Dr. King's advice. I found a hard mass the size of my fist, imbedded in the tissues on the outside of the left leg, a little above the middle. The overlying skin was not much discolored nor very adherent. The patient states that the tumor is now larger than it was when first removed. My diagnosis was sarcoma, and I advised that he should submit to amputation; this was made a few days later by Dr. Clarence King, at the knee joint, and the wound healed kindly, with an excellent resulting stump. A piece of the growth was sent me for examination, and proved on examination to be a small, round celled sarcoma.

I heard nothing further from the case until January, 1888, when by Dr. King's advice the patient returned to consult me. At this time, he presented a growth, the size of a hen's egg, a little above and to the outer side of the left nipple; it was fast, tender, but with movable overlying skin, apparently involved the whole thickness of the thoracic wall; neighboring glands not involved. His general condition was good; chest expansion was normal, and on careful auscultation, no difference was detected between the sounds of the two lungs. There was no dulness on percussion in the neighborhood of the tumor; his main complaint was of severe pain; incidentally he acknowledged that he had been losing a little flesh of late. Without trying to determine exactly the extent of the tissue involved, I advised him to submit to

removal of the growth, if he desired any further operation; to this he willingly consented. January 21, 1888, in my clinic at the Buffalo General Hospital, the operation was made. Ether was the anæsthetic, which he took kindly. The skin over the tumor was separated without any difficulty, after a crucial incision had been made; on dissection it at once appeared that two, if not three, ribs were involved in the mass, and that total excision would be necessary. To this end, I began to separate the periosteum on the inner side of the last rib involved, at a short distance from the edge of the mass. The rib proved extremely fragile, broke during my efforts, and a spicule of bone was forced through the pleura. So soon as I saw that the pleural cavity was thus opened, I rapidly dilated the opening with my finger, and determined that the growth was larger on the inner side of the thorax than on the outer; also that there was adhesions in at least one place to the lung beneath. Having gone so far, I immediately decided to extirpate the entire mass. As rapidly as possible I excised the tumor with the four ribs which seemed involved, and which proved to be the fourth, fifth, sixth and seventh; thus taking out a portion of the thoracic wall, some five inches in length by $3\frac{1}{2}$ inches in width. After removing all of the thoracic attachments, I found that the band of adhesion connecting it with the lower border of the upper lobe of the lung, was long enough to tie, and after throwing around it a strong ligature, the mass was easily detached. During and after its removal, a beautiful demonstration of the action of the heart in its pericardial sac was afforded. Hasty examination of the left lung, both ocular and by palpation, revealed numerous nodules scattered through the lung tissue of both lobes and on their surface. Had there been a single sarcomatous mass accessible, I should have excised a portion of the lung. Under these circumstances, such a measure was out of the question.

During all this procedure, his respiration was but slightly disturbed, it became more rapid, but the rhythm was not much altered; his pulse, however, became quite weak and stimulants were frequently given hypodermically. As quickly as I could, I checked what little hæmorrhage there was, and closed the wound with numerous continuous sutures; over this iodoform was dusted and an antiseptic compress snugly bandaged down. At the close of the operation his face was slightly cyanosed; his pulse was 140; his respirations 30 to the minute.

Within the hour he was conscious and complained of great pain, which was checked by morphine subcutaneously administered. Dur-

ing the ensuing night he was quite restless and required anodynes in large amount. At one time his pulse was as high as 170 and very feeble. On the following day, the temperature was 97°, pulse 130, of fair volume. He was comparatively comfortable and taking sufficient nourishment. For the ensuing few days he progressed very favorably, only once was his temperature as high as 101.1°; his respiration rate fluctuated between 30 and 50 for two or three days; his left lung seemed to be inflated to a considerable extent. January 27, at noon, his face was a little cyanosed and anxious; his respiratory murmur on the left side had lost the vesicular character which for three days it had had; he was very faint; dressing had not been changed at all. Towards evening he began to fail and became delirious. He died early the following morning.

Five hours later, I reopened the wound, which it was found had completely united by first intention. The cavity of the left pleura was filled with a bloody serum, in which the lung seemed to have macerated, since it was soft and tore easily. This fluid had no odor at all. The hand was passed into the right pleural cavity, and it was found that the right lung was just as much studded with sarcomatous nodules as the left.

COMMENTS.—The equal affection of the two lungs will account for the fact that on auscultation, previous to operation, no difference was detected. The tumor itself was too tender to admit of percussion within 1½ inches of the periphery; had this not been so, possibly more information might have been elicited on percussion. Aside from the very slight emaciation of the patient, which he explained by saying pain had kept him in the house of late, there was nothing about the general appearance of the patient or the features which he presented to lead one to suspect any such extensive internal lesion as was found.

Previously reported cases, to which I have called attention in an article published in the *ANNALS OF SURGERY* for May, 1887, have demonstrated the fact that one side of the thorax may be operated on extensively without any alarming disturbance, or requiring resort to artificial respiration. These cases had prepared me to proceed to excision of the lung without hesitation, had circumstances favored the procedure. As it was, nothing of the kind was practicable. How long the fluid

which the autopsy showed, had been present, I could not positively say. Until forty-eight hours before his death, a fair respiratory murmur had been heard on the left side, wherever I could listen without disturbing the dressing. Considering the necessarily fatal character of his condition, I had not thought it worth while to remove the dressing, in order to make any further investigation. It seems to me that this accumulation was rather of the nature of an œdematous collection. The blood-stained fluid was almost pure serum; no hæmorrhage, other than the slightest oozing, took place after the wound was closed.

Microscopical examination of the thoracic tumor showed it to be a small spindle cell sarcoma, while the nodules found in the lung of the same side, showed distinct sarcomatous elements, but of round cells. It is of some pathological interest to know how secondary growths may vary in type from that of the parent tumor.

CASE OF PENETRATING GUNSHOT WOUND OF
THE ABDOMEN, WITH WOUND OF INTES-
TINE AND FÆCAL EXTRAVASATION;
LAPAROTOMY; INTESTINAL SU-
TURE; RECOVERY.

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ON MAY 6, 1888, Herman L., æt. 19 years, was shot in the abdomen by the accidental discharge of a 38 calibre revolver, held in the hands of a companion.

An hour later he was carried to the Cook County Hospital, about one mile distant. On admission he was suffering from shock and complained of some pain.

Catheterization of the bladder showed no blood; an aseptic dressing was applied over the wounded abdomen. Four hours later, I arrived at the hospital, and found the patient with a somewhat quickened respiration, a temperature of 101.8°F.

abdomen quite tympanitic and presenting a ragged edged wound 40-100 of an inch in diameter, three inches to the right, and one inch below the level of the umbilicus. Posteriorly, two and one-half inches to the right of the vertebral spine, and on a level with the wound of entrance, the bullet could be felt just beneath the integument, resting in the meshes of the gluteus maximus.

As the missile had without doubt passed completely through the abdominal cavity and the bony wall of the pelvis, and had in all probability penetrated the intestines in its course, immediate laparotomy was determined upon. The patient was put under moderate anæsthesia, and the accepted precautions of modern asepticism in abdominal section were followed out with the assistance of Drs. Willard and White, *internes* at the hospital. A median incision three inches in length, and passing upward through the umbilicus was made, the omentum gently pushed to the left and the presenting coils of intestines examined, till the ascending colon was reached. Here the gut was found blood-stained and ecchymotic for a distance of several inches, though the hæmorrhage could not be considered profuse.

After thoroughly douching the peritoneal cavity with boracic acid water, the wounded colon was brought into view through the abdominal incision, and further examination revealed three perforations distant from each other about an inch, through the central one of which oozed fæcal matter. The gut was held *in situ* by the fingers of an assistant, and each side of the wounds clamped with forceps the jaws of which were covered with rubber tubing. Though much discolored, I doubted the advisability of joining the wounds by incision, preferring to scissor the ragged edges and close each perforation separately, which was done with three interrupted catgut sutures placed in each. The colon was carefully sponged, as well as its bed, and returned to its place. The wound of entrance was irrigated, but the wound of exit was not found.

The patient was now considerably depressed, but quickly revived under the stimulating effect of the sterilized hot-water intra-abdominal douche.

After carefully unfolding the omentum, a rubber drainage tube was placed in the lower angle of the abdominal incision, the peritoneum closed with a continuous catgut suture, and

the muscular tissue and skin with interrupted silk stitches. To prevent the rubber tubing from slipping into the abdominal cavity it was stitched to the skin. The ordinary toilet of the the abdomen was made, but in lieu of an elastic bandage a Martin's rubber bandage was used to more securely hold the dressings and support the abdominal walls.

As the bullet was not in a position to produce any serious result, and as I did not wish to subject the patient to any operative procedure not imperatively demanded at the time, it was left to be removed during some subsequent dressing of the wound.

The patient was now put to bed, surrounded with artificial heat, and the following instructions given to the attendants:

Nothing to be given by the stomach but cracked ice; to be nourished by enemata of peptonized milk and beef tea; thirst to be partially allayed with warm water used in the same manner; if stimulation is needed, hot milk and whiskey by the rectum; morphine hypodermically sufficient to allay pain and quiet nervous irritability; aconite if the pulse and temperature should rise, and sulphate of quinine to prevent too rapid tissue metamorphosis.

On recovering from the effects of the ether, the patient vomited a considerable mass of undigested food.

From the day of the operation, the sixth till the ninth, the pulse fluctuated from 110 to 120, and the temperature from 100° to 102.3° Colicky pains began almost on the recovery of consciousness, and continued till the third day. Believing the the drainage tube to be the cause it was removed.

On the fourth day the bowels moved showing no trace of blood.

The ninth day the morning temperature fell to 99°F. He had slight hallucinations which were evidently due to a mild degree of starvation. Liquid food was now given him by the stomach for the first time.

He now began to complain greatly of cramps in the right extremity, and lancinating pains in the region of the great trochanter. Although no marked swelling or hyperæmia of the parts was noticeable, yet it was deemed advisable to enlarge the wound of exit. This being done the track of the bullet

was irrigated, the return flow bringing away a number of minute fragments of bone.

About the fifteenth day a small superficial abscess formed at the anterior bullet wound. This healed in about ten days.

There was, however, sufficient septic disturbance in the case to keep up a slight rise of temperature for over two months. At the present writing, three and a half months after the injury, the posterior wound is entirely healed. The long continued discharge being, very likely caused by the injury to the ilium.

To a casual observer the patient presents no appearance of having passed through such an ordeal.

The recovery of the case may be largely attributed to,

1. The constitutional robustness of the patient.
2. Absence of peritonitis, and non-injury to the spinal column.
3. The intelligence and personal care of the House-Surgeon, Dr. Willard.

The following are probably some points of error in the management of the case :

1. Knowing with so much certainty the course of the bullet, the line of incision should have been made through the wound of entrance.
2. The continuous suture, is undoubtedly preferable to the interrupted one for the intestines.
3. Feeding by the stomach ought not to have been delayed beyond the fifth day.

EDITORIAL ARTICLES.

THE SURGERY OF THE BRAIN AND SPINAL CORD.

Cerebral surgery is advancing to a position well abreast with her twin sister, abdominal surgery. In a former volume of this journal¹ appeared a review of the status of operative interference with the human brain at that time, and since then, as the occasion arose, the various notable advances in this direction have been chronicled in the index of surgical progress. The subject has again² been discussed both from the neurological and the surgical stand point in two recent papers. Dr. SEGUIN believes that the diagnosis of a case of supposed tumor of the brain should, before an operation is attempted, be carefully worked out in not less than five lines of inquiry or secondary diagnoses. 1. The diagnosis of the tumor within the skull, and more especially, in or upon the cerebral hemispheres. 2. The diagnosis of the exact location of the tumor. 3. The diagnosis of the depth of the tumor; whether it be cortical or subcortical. 4. The diagnosis of the solitude or multiplicity of the tumor. 5. The diagnosis of its nature.

First.—The diagnosis of cerebral tumor is accurately made, as a rule, by the experienced physician from the gradual development of symptoms, such as headache, convulsions local or general, paresis and paralysis, co-extension of these symptoms, moderate anæsthesia, choked disk, hemianopsia, stupor, coma and slow pulse.

¹Operative Attacks upon the Human Brain. By S. LLOYD, M. D., ANNALS OF SURGERY, vol. iv. No. 6 December, 1886, p. 499.

²Contribution to the Diagnosis and Surgical Treatment of Tumors of the Cerebrum. By R. F. WEIR, M. D., (New York,) and E. C. SEGUIN, M. D., (New York.) American Journal of the Medical Sciences, July, August, September, 1888.

An address on the Surgery of the Brain and Spinal Cord, delivered at the annual meeting of the British Medical Association. By WILLIAM MACEWEN, M. D., (Glasgow,) British Medical Journal, Aug. 11, 1888; Lancet, Aug. 11, 1888; Medical News, Aug. 18, 1888.

Second.—The diagnosis of the topographical location of the tumor is arrived at through the application of the principles of cerebral localization. 1. Lesions of certain parts of the cerebrum produce no directly localizing symptoms, the patient exhibiting only general symptoms of cerebral disease. In this category fall (*a*) the frontal lobes strictly speaking, except the caudal extremities of its external gyri, more especially the second and third; (*b*) the apex and base of the temporal lobes on both sides, and the whole of the lobe on the right side; (*c*) the external and basal aspect of the occipital lobes; (*d*) parts of the parietal lobes; and (*e*) the central ganglia. The fasciculi of medullary substance connecting these parts with the base of the brain and with other parts of the cerebrum (commissural fibres) are included as inexcitable parts.

2. There remain two irregular divisions of the cerebrum, lesions of which give rise to special, definite, localizing symptoms: I. The excitable or motor zone, cortex and attached fasciculi; II. The known sensory zones with fasciculi.

1. *Tumors of the motor zone.*—(*a*) Tumors of the caudal extremities of the third frontal gyrus (on the left side in dextrous persons) produces at first slowness of speech and paroxysmal motor aphasia. Their extension toward the rest of the motor zone causes paresis and convulsive movements of the tongue, face and upper extremity on the opposite side. Later still these symptoms, motor aphasia, spasmodic movements, and paralysis of the tongue, face and upper extremity, become more frequent and finally permanent; with occasional spasms.

(*b*) Tumors of the basal ends of the pre- and post-central gyri cause at first convulsive movements, or paresis, or both, of the opposite half of the tongue; later, paroxysmal motor aphasia, spasm and paresis of the face and upper extremity; last, complete paralysis of one half of the tongue, of the face and upper extremity, and permanent aphasia, with occasional convulsions (Jacksonian movements.)

(*c*) Tumors of the caudal extremity of the second frontal gyrus, where it becomes confluent with the lower third of the pre-central gyrus, produce at first paresis with convulsive movements (or *vice*

versa) of the facial muscles of the opposite side; later, the same symptoms with the addition of more or less motor aphasia, paresis of one half of the tongue, paresis and spasm of the upper limb, more especially the fingers; lastly permanent paralysis of the face, half of the tongue and hand, permanent aphasia and occasional spasms.

(*d*) Tumors starting in the lower middle third of the pre-central gyrus first become apparent by spasm and paresis of the opposite thumb and finger, and occasionally the whole hand and forearm. After further growth, the irritative and destructive symptoms appear in the face and tongue and more or less marked aphasia occurs, the paresis of the hand and forearm becoming complete paralysis. A peculiarity of this centre, not as yet proven to exist in lesion of the other centres of the motor zone, is pronounced subjective numbness and slight though usually demonstrable tactile anæsthesia.

(*e*) Tumors of the upper middle third of the pre-central gyrus—and perhaps of the post-central also—cause early symptoms in the muscular apparatus of the upper arm and shoulder. Later the spasm and paresis extend to other parts, according as the growth extends ventrad or dorsad. In the former case, the forearm and hand, the face, and half of the tongue show symptoms, and lastly, aphasia may occur, though rarely complete. If the tumor grows dorsad towards the longitudinal fissure, spasm and paresis, later paralyses show themselves successively in the thigh, leg and foot.

(*f*) Tumors of the upper third or top of the pre- and post-central gyri and of the paracentral lobule at first cause symptoms, convulsive and paretic in the thigh, leg or foot. There is every reason to believe that in man the special subcentre for the hip and thigh is the cortex of the central gyri where they bend over to form the paracentral lobule, while the lobule itself innervates the legs and toes. Later, by extension of the morbid growth, there are symptoms in the arm and hand, rarely in the face, probably never aphasia—except in the rare cases where a peculiar vitality of the patient permits the growth of a colossal tumor. Or there may be invasion of the crural centre of the opposite hemisphere, producing paralysis with spasm or without spasm of both legs—pseudo-paraplegia.

2. *Tumors of the sensory zone.*—Lesions of those areas of the sensory zone whose functions are best known to us, viz., the centres for half vision and for audited speech manifest their presence almost exclusively by the so-called destruction symptoms. Irritation symptoms probably occur but we have little knowledge of them.

(a) A patient presenting, besides the general symptoms of an intracranial growth, such a specific symptom as verbal deafness, without marked hemiplegia, hemispasm or hemianæsthesia, probably has a tumor involving the left superior or dorsal temporal gyrus or its sub-jacent white fasciculus. The symptoms produced by extension of this growth would be mostly sensory, such as paræsthesia, loss of muscular sense, and later, anæsthesia of parts on the opposite side of the body.

(b) A patient who has headache, vomiting, choked disk, dulness tending to stupor, increasing hemianæsthesia with lateral hemianopsia—dark half-fields on the same side as anæsthesia—without hemispasm or hemiplegia, quite certainly has a tumor in the white substance of the occipital lobe.

(c) If with the above named general symptoms of cerebral tumor, we find lateral hemianopsia alone as a localizing symptom—*i. e.*, without hemispasm, hemiplegia and hemianæsthesia—there is almost certainly a tumor on the inner or mesial aspect of the occipital lobe, opposite to the dark half-fields, compressing and destroying the cuneus. The symptoms to be expected from the extension of such a tumor are, from its growth upward, weakness and even paralysis of the lower extremity of the same side as the dark half-fields; and from its downward growth symptoms of injury to the cerebellum and optic lobes.

Third.—The diagnosis of the depth of the tumor—whether it be cortical or sub-cortical—is much more doubtful. The only symptoms which are sufficiently special to be of advantage are (a) the nature and location of the signal symptom, the presence and order of appearance of spasm or paresis; (b) presence or absence of headache; (c) changes in local cranial temperatures. But a careful consideration of these points leaves us in such uncertainty that we are obliged to conclude that at the present time it is impossible clinically to distinguish a cortical from a subcortical tumor.

Fourth.—The diagnosis of the solitude of the tumor is less uncertain, although it must necessarily remain doubtful. (a) When the symptoms of cerebral tumor occur in an individual who already bears a tumor or presents signs of tuberculosis, the probability that the cerebral secondary deposit is multiple will be very great, and for this and other considerations an operation will be unadvisable. (b) When symptoms indicating lesions of different cerebral centres or systems are present, and especially when symptoms of basal disease are combined with those characteristic of tumor of the motor or sensory zones, the probability of double or multiple lesion will be so great as to amount almost to a certainty.

Fifth.—The diagnosis of the nature of the tumor is all important as a negative element in some cases in deciding for or against an operation. (a) It would be undesirable to interfere in a case of brain tumor complicating tuberculosis of the lungs or other organs or general tuberculosis, on account of the probability that the cerebral growth is tubercular. (b) The coexistence of a recognizable cancerous growth of other parts or of a cancerous diathesis would contraindicate operation because of the probability of multiple cerebral growths and the fact that other organs are affected with incurable disease. (c) In cases where the clinical indications point to the existence of a gumma or gummata, in spite of the contrary opinion of v. Bergmann, operation is thought desirable in well selected cases after a thorough medicinal treatment has been carried out.

The diagnosis of all other forms of intracranial growths is most obscure, and we can only be guided by statistical results as to the absolute and relative frequency of the varieties of tumors, and it should be borne in mind that the deductive application of such data to a case in hand is extremely uncertain—almost mere guess work.

It may be concluded from the foregoing discussion that "*the surgeon must be content to have the physician furnish him with a reasonably exact diagnosis of the location of the tumor and with a probability diagnosis of its solitude.*" Except in cases of secondary new formation—in which an operation is almost positively contra indicated—and in cases of cerebral gummata, the diagnosis of the nature of the tumor and of its encapsulation or infiltration should be withheld.

Seguin and Weir's case of subcortical sarcoma lying below the edge of the second frontal and the anterior edge of the precentral gyri.—A German man, æt. 39, had suffered for two years from epileptiform seizures, and for several years previously from occasional spasmodic twitchings. Observation of the patient for a couple of months, with varying medicinal treatment, showed a continuation of the seizures, paralysis of the right lower facial muscles, paresis of right arm, leg apparently normal, constant drooling from the right side of the mouth; slight aphasic and agraphic faults; slight tactile anæsthesia on the pulps of the left fingers, more marked on the thumb and index; muscular sense preserved. No symptoms in optic apparatus. The greatest tenderness to percussion, coinciding with the seat of greatest pain, was in a spot just in front of the auriculo-bregmatic line, and from 8 to 10 cm. above the external auditory meatus. This right-sided Jacksonian epilepsy with facio-brachial paresis, pointed to a tumor, probably sarcomatous and subcortical of the left motor zone in the facial centre. Under ether anæsthesia, the point of operation having been located by Dr. SEGUIN, Dr. WEIR raised a scalp flap, and with the trephine and gouge removed a portion of the skull, three by two inches. The membranes being opened, the brain was observed to bulge decidedly into the opening, although nothing abnormal was seen on the exposed surface. After some unsuccessful exploration with the finger, firm pressure posteriorly encountered a deep resistance of a hard mass of the size and shape of the end of the forefinger underneath the previously suspected convolution. It was readily enucleated, although not encapsulated, with the aid of a blunted Volkmann's spoon. A separate piece, the size of a pea, was then recognized and removed. The toilet of the wound was then made, drainage supplied, the dura sutured, the disks of bone and a number of the fragments removed with the rongeur, reimplanted and the wound closed. The patient progressed to a good recovery, being allowed to go home after a month, in good general condition and unquestionably better as regards paresis of face and hand, but still with occasional twitchings, some headache and slight paresis of right lips and cheeks.

OPERATIVE PROCEDURES.—The following points are particularly noted by Dr. WEIR: The operation should be attended with the strictest antiseptic precautions throughout. A curved flap both of the scalp and dura mater is of advantage in securing protection to the brain after the completion of the operation. Hæmorrhage from the large scalp-incision involved may be controlled to a considerable extent by encircling the head tightly on a line with the occipital protu-

berance with a rubber band. The careful outlining of the region to be explored upon the shaven scalp is of no avail after the flap has been lifted away, and it is therefore of some importance to indicate the site of the trephine center upon the bone itself.

The cranial opening should be a large one both for the removal of a large growth and for exploratory purposes. Horsley applies a two-inch trephine in two places; Weir uses a one-inch trephine. The intervening ledge of bone can be quickly cut away by a muscular surgeon with Luer's or Robert's rongeur forceps. A dental or electrical bone-cutter permits more rapid work. The dura mater should also be freely opened, the accuracy of diagnosis thus obtained more than compensating for the supposed additional risk. The exploring needle is of little value, and it has been known to cause fatal hæmorrhage. After exposure of the brain, if by its surface markedly bulging, which is always abnormal, or if by its loss of pulsation or by a marked change in color, it does not indicate the presence of a tumor, solid or fluid, then the surgeon should, by gentle but firm pressure, palpate the bared convolutions, and he can even insinuate the pulp of his finger under the bony edge of the opening to a short distance with safety.

Important vessels, such as the longitudinal or lateral sinuses, after the removal of the superjacent skull, can be lifted from their places and drawn aside without risk by pulling upon the dural flap. The attached base of the flap, when near a sinus, should be toward the vessel.

A bony closure of the cranial opening is most satisfactorily obtained by carefully preserving the trephine buttons in cloths wet with a 1-60 carbolic solution, and kept warm during the operation by immersing the vessel containing them in warm water. They can then be replaced after the operation, any gap being filled by the other fragments, chopped up.

Hæmorrhage from the bone may be controlled by pressure, plugging, or better still, by crushing the edges of the opening by blunt forceps. Bleeding from the dural vessels may be checked by catching them up with a tenaculum and applying a ligature. Vessels of the pia mater are easily torn, and bleeding from them is best checked by securing them with a tenaculum and applying a ligature with equal traction of its ends. Any vessel of size in the brain substance itself or in the depths of the convolutions should be seized and secured, with clamps if ligature is impracticable.

When the tumor is not strictly superficial, it can, after being recognized by palpation, be reached by an incision or by gently tearing

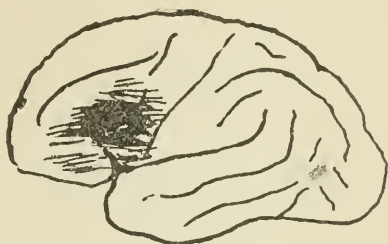
through the cerebral tissue with the end of the finger or a director. The handle of a spoon will then very satisfactorily aid in its extraction, and a carefully blunted Volkmann's spoon is of advantage.

All hæmorrhage having been checked, a small perforated rubber drainage tube should be inserted, to be removed, especially in a favorably progressing case, as late as the end of the second or third day. The dural flap is then stitched in place with fine catgut sutures, the flap having been cut from one-eighth to one-fourth of an inch within the edge of the bone to leave space for the application of the sutures. The bone fragments now being replaced with a few strands of horse-hair or catgut placed among them to emerge with the drainage tube, the scalp flap is returned and sutured, all bleeding points having been secured. Over all a sublimate dressing should be applied, with iodoform dusted over the layer resting upon the wound. Finally, it is better to keep the head somewhat elevated for a few hours after the operation.

The address of Dr. MACEWEN deals exclusively with his own extensive experience in brain surgery, and treats the subject rather clinically than diagnostically. (1) The results of antiseptic surgery having shown that inflammation, arising from exposure of and operations upon the cerebrum, could be obviated under aseptic conditions; and (2) the physiological researches which made it possible to localize by idiopathic symptoms lesions of the encephalon, having rendered possible the diagnosis of the location of certain cerebral lesions, as early as 1876 Dr. Macewen advocated operative relief in such cases.

"1. *Case in which the Symptoms of Local Cerebral Disease led to the Diagnosis of a Lesion in Broca's Lobe.*—The following case was seen in July, 1876. The patient's forehead bore a cicatrix marking the site of an injury under which the skull was bare. Had his cicatrix been taken as a guide to the localization of the abscess and an operation performed there, no abscess would have been found. But other phenomena were exhibited which enabled its seat to be definitely recognized. A convulsion commenced on the right side, and gradually involved the whole body, accompanied by loss of consciousness. On its cessation, absolute hemiplegia of the right side was present, and remained for two hours, during which patient was aphasic. Both these phenomena became much less marked at the end of this period. From these symptoms the abscess was diagnosed to be situated in the

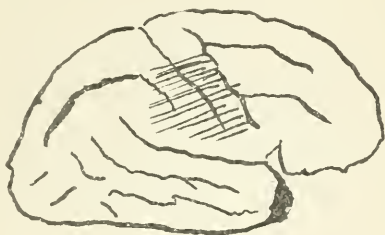
immediate vicinity of Broca's lobe. It was evident that the whole of the base of the left third frontal was not involved in a destructive lesion, otherwise the aphasia would have persisted for a much longer period, and it was probable that Broca's area had become involved in the inflammatory zone surrounding the abscess. Trusting to these localizing symptoms, it was proposed to open the abscess aseptically



by exposing Broca's lobe. Unfortunately, the result of a consultation was decidedly to negative this proposal. The parents then refused consent, notwithstanding the assumption by Dr. Macewen of the sole responsibility of advising and performing the operation. Thirty-six hours afterwards the convulsions returned and persisted until a fatal issue ensued. After death the friends acquiesced in a proposal to have the operation performed just as it should have been, had permission to do so been granted during life. The skull was trephined, the brain exposed, and an instrument was introduced through the third frontal convolution for half an inch, when pus flowed through the incision proving the accuracy of the diagnosis, and giving poignancy to the regret that the operation had not been permitted during life. The abscess, about the size of a pigeon's egg, was situated in the white substance of the second and third frontal convolutions.

"2. Case in which Motor Phenomena were the sole Guides to the Diagnosis of an Intracranial Subdural Effusion of Blood.—In 1879 a boy had, consecutive to a fall six days previously, a series of convulsions, the twitchings beginning in the left side of the face, gradually involving the left arm and subsequently the left leg, during which consciousness was preserved. Paresis of these parts remained, though sensation was unimpaired. On the following day, there was a renewal of the convulsions, the parts being affected in the same general order, but the convulsions persisted and finally became general, with loss of consciousness. These motor phenomena indicated a lesion on the

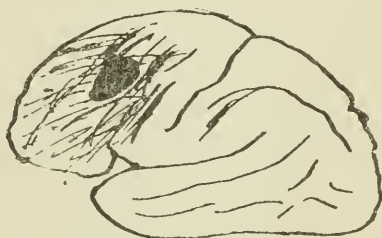
right side of the brain, pronounced at the middle and lower portion of the ascending convolutions, as the face and arm centres were the first to show evidence of stimulation. The lesion was evidently of an irritative nature such as might be occasioned by severe cerebral contusion, and presented a sufficiently clear guide to the localization of the lesion in the lower part of the fissure of Rolando. It was therefore resolved



to expose that portion of the brain. As a preliminary the head was shaven, when a scarcely perceptible irregularity was detected in the cranial vault near the coronal suture. When the skull was exposed, a fissure was discovered running across the coronal suture. Trephining was performed at a point slightly behind the auriculo-bregmatic line, and midway between the external auditory meatus and the vertex. This point happened to correspond to the posterior extremity of the fissured fracture. There was no blood between the dura mater and the skull, but the dura had a very dark color. This membrane was opened and gave vent to two ounces of fluid and coagulated blood contained in the subdural cavity. The operation was conducted aseptically, and the patient made an uninterrupted typical, afebrile recovery. There was no recurrence of the fits, the paralysis of the left arm soon disappeared, and he is living now, and in perfect health.

“3. *Case of Tumor of Dura Mater in which the symptoms exhibited pointed to lesion in frontal lobe.*—In 1879, an idiopathic case came under observation, in which the totality of the symptoms indicated a lesion in the left frontal lobe of the brain. It occurred in a patient the subject of a small tumor above the left eyeball in the orbital cavity. A tumor had previously been removed from that position, and had now recurred. Other symptoms had however meanwhile presented themselves. The left pupil was in a state of stabile myosis there was obscuration of the intelligence, slowness of comprehension, want of mental

vigor and pain in the head. These pointed to the probability of a lesion in the left frontal lobe, but were not sufficient to permit a diagnosis to be made. The patient was therefore placed under the observation of an educated skilled nurse. Some weeks later, a series of convulsions occurred, the initial stages of which were carefully recorded by the nurse, without which the key to the brain lesion as indicated by the convulsion would have been lost, as when seen by Dr. Macewen they had become general, and threatened speedy dissolution. The convulsions were at the onset, strictly confined to the right side, commencing in the face and arm, and confined to these two parts during the initial attacks, the leg on the same side was effected during the third seizure, and ultimately the convulsions became general, with complete loss of consciousness. These phenomena were construed as indicating extension of the irritation to the lower and middle portions of the



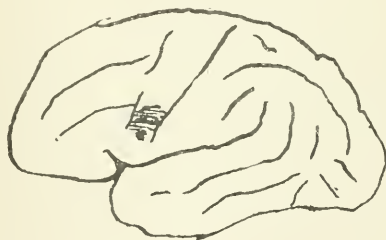
ascending convolutions, and when this was considered along with the former evidence, it was concluded that an irritative lesion existed in the left frontal lobe. On these grounds it was resolved to trephine midway between the centre of the ascending convolutions and the anterior aspect of the cranium. At this point a minute nodule the size of a barley grain was detached, on the outside of the skull. A large trephine was applied, a disc of bone removed and a tumor of the dura mater, which was exercising pressure on the brain was exposed. It was half an inch in thickness at this point, gradually becoming much thinner and spreading all over the anterior two-thirds of the frontal lobe. The tumor was after a prolonged operation carefully dissected out along with the brain membranes, where they were involved in the neoplasm. The patient rapidly recovered, was restored to perfect health and subsequently was able to gain her own livelihood. She lived for eight years afterward, ultimately becoming affected with chronic Bright's

disease from which she died. The skull and brain were examined, and there was no trace of further tumor growths. This case was published in 1879."

The author then adds three cases operated upon in 1883, (5) an intracranial effusion of blood, (6) a syphilitic tumor in the paracentral lobule and (7) an extravasation of blood into the substance of an ascending convolution, all of which were diagnosed by motor symptoms alone and all of which were relieved by operation. He also in 1881, localized (4) an abscess in the temporo-sphenoidal lobe, which he opened much to the relief of the patient, who, however, died from exhaustion soon after. All of these operations were done before 1883, which is an important point in considering priority of operation.

In support of his belief that in many cases the localization of brain lesions is easy Dr. Macewen adduces several cases, which we quote in full.

"8. *Epilepsy (Jacksonian) induced by Focal Facio-Lingual Lesion, Cured after Removal of Cyst from Brain.*—A man, æt. 22, suffered



epileptiform convulsions, each lasting from two to three minutes, and as they occurred on an average every five minutes, he consequently had over one hundred in twenty-four hours. The convulsions were limited to the tongue, the right facial muscles, and the platysma on the same side. When they subsided, the parts remained paralyzed. Consciousness was retained throughout. Eight years previously, he received an injury to the head, after which his right arm became weak, the weakness persisting though he was quite able to work. It was clear

that an irritating focal lesion existed, confined to the base of the ascending convolutions, causing a Jacksonian epilepsy. The only question was, whether the base of the ascending parietal was involved as well as that of the ascending frontal. The contraction of the platysma on the opposite side is asserted to be induced by stimulation of the base of the ascending parietal. Dr. Whitelocke suggested, however, that the platysma is often supplied by a branch of the facial, so that a single lesion in the base of the ascending frontal would be sufficient to account for the whole phenomena. The operation was at once undertaken, when in the lower part of the ascending frontal, a cyst about the size of a filbert was found situated partly in the cortical and partly in the white substance of the brain, and was surrounded by a narrow zone of encephalitis. In manipulating the medullary substance, in process of removal of the cyst, the patient, while under chloroform, had a convulsion, confined to the same group of muscles as were affected in his fits prior to the operation. The convulsion ceased with the removal of the cyst, and he has never since had another. The wound healed firmly under one dressing, the paralysis of the facial muscles soon disappeared, and he has since been constantly at work. The power of the right arm has also been increased. Possibly the cyst might have caused indirectly slight pressure on, or setting up an inhibitory action of the middle portion of the ascending frontal."

This case affords important evidence of the position occupied by the facio-lingual centre in man, and on the whole corroborates that assigned to it by experiments on the lower animals. It was also interesting to note, when the part in the brain was exposed and irritated that it gave rise to the same kind of convulsion.

9. "*Protospasm of the hallux preceded by sensory impressions and followed by paralysis.*—In another instance, a very definite protospasm accompanied by a sensory impression gave the key to the localization. It occurred in a girl, æt. 7, the subject of frequently recurring attacks of severe epileptiform seizures, followed by paralysis of the affected parts. At the onset of these attacks, patient first experienced in the great toe of the right foot a painful sensation of such severity as to cause her to scream out. Shortly after that, the toe was firmly extended in tonic spasm which lasted about five minutes. Sometimes this ended the attack. More frequently, it was followed by clonic contractions of the muscles of the right foot, leg and thigh, where the convulsions often terminated.

"Occasionally they extended to the muscles of the trunk, then to those of the right side of the face and right arm, the contractions ceasing in the order of accession. Rarely did they involve the opposite side, and when they did, patient lost consciousness. Though there was motor paralysis in the affected parts, the cutaneous sensibility remained unimpaired.

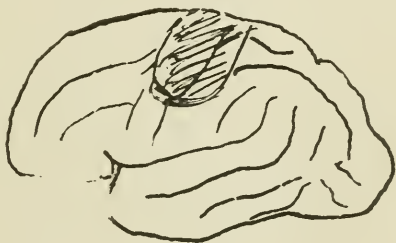
"From the great number of fits which patient had, following each other in rapid succession, occurring in parts affected with paresis the result of former attacks, while the cutaneous sensibility remained unimpaired, and from the limited area affected, it was concluded that the lesion was cortical. The sensory impression in the hallux followed by tonic and then clonic contraction of the same part, extending to the lower limb, pointed to the upper region of the ascending convolutions as the area of irritation. From the general condition of the patient



and family history, the lesion was probably tubercular, and if so might be multiple. During operation the upper portion of the descending convolutions was exposed, and with the exception of a few tubercular nodules the size of barley grains adhering to the vessels over the upper part of the ascending frontal, there was nothing visible on the surface. On careful palpation of the ascending convolutions, there was found in the upper part of the ascending parietal, a circumscribed nodule buried in the brain substance, which on exposure by cutting through the grey matter was seen to be a tubercular tumor about the size of a hazel nut which was easily shelled out. As an immediate result, there was prolonged trepidation of an erratic kind, affecting the muscles of the right side of the body, but especially those of the arm and leg. These were continuons for fully a week, thereafter gradually subsiding. There have been no fits for over a year, and the girl is now in excellent health.

"The marked sensory impressions which this lesion produced, support Dr. Gowers' opinion that the parts in the so-called motor area subserve a sensory as well as a motor function. The localization of the movements of the hallux in the upper part of the ascending frontal has not been borne out by this case, (unless the minute barley grain tubercular nodules attached to the vessels in the pia mater could account for the stimulation). the tumor being found in the upper part of the ascending parietal, but the whole lesion could be included in the ring which Beever and Horsley place on the upper portion of the ascending convolutions.

10. "*Brachiorural monoplegia; cyst removed from upper part of ascending convolution.*—In another, occurring in a boy, æt. 3, a brachiorural monoplegia with late rigidity was present, the result of a traumatism received eight months previously. In it a large thick



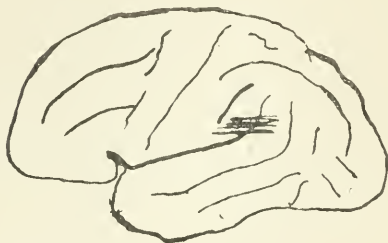
walled, sub-dural cyst, containing clear fluid was found pressing upon the motor convolutions, and a spiculum of bone detached from the inner table of the skull was seen to have penetrated the brain. These were removed, and the bone was replaced in normal position. The patient made an uninterrupted recovery. The paralysis with the contraction of the muscles passed off to a great extent. He could neither walk nor stand before the operation. Now he can run about and use his hand well, though there is still a paresis in both."

With these data from the experience of Macewen as well as from cases reported by Godlee, Horsley and many others, it is clear that the motor and sensory phenomena form reliable guides to localization of lesions in the central convolutions,

The following case is an illustration of the fact that the diagnosis of cerebral lesions in non-motor regions may also be made from sen-

sory phenomena. It also shows the difficulty of finding the exact clue to the lesion, and how easily it may be overlooked.

"II. *Psychical blindness the guide to a hidden lesion in angular gyrus. Interesting medico-legal aspects. Recovery.* A



man who had received an injury a year previously, suffered from deep melancholy, strong homicidal impulses relieved by paroxysms of pain in the head of indefinite seat. Though the pain was excruciating, he welcomed it, as it temporarily dispelled the almost irresistible desire to kill his wife, children or other people. Prior to receiving this injury he was perfectly free from impulses of this kind, and had a happy life with his family. Behind the angular process of the frontal there was a slight osseous depression which could not account for his symptoms. There were no motor phenomena, but on *minute* inquiry it was discovered that immediately after the accident, and for about two weeks subsequently, he suffered from psychical blindness. Physically he could see, but what he saw conveyed no impressions to his mind. An object presented itself before him which he could not make out, but when this object emitted sounds of the human voice, he at once recognized it as a man who was one of his fellow-workers. By eye sight he could not tell how many fingers he held up when he placed his own hand before his face, though by exercise of his volition in the act and by his own sensations he was cognizant of the number. He had been in the habit of reading the New Testament, and when he had so far recovered from his injury, he wished to resume his reading. He knew where the book lay near his bed and could put his hand on it in the dark. One day he stretched out his hand, took the book, recognizing it by its smooth leather covers and the deeply indented letters on its

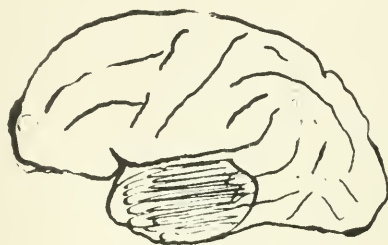
back ; he opened it, saw what he considered must be the letters, and the blocking of them into divisions for the words, but they were unknown symbols, they conveyed no impression of their meaning, the memory of their signs was gone, it was a sealed book to him.

"These phenomena, however, gave the key to the hidden lesion in his brain. On operation the angular gyrus was exposed and, it was found that a portion of the internal table of the skull had been detached from the outer, and had exercised pressure on the posterior portion of the supramarginal convolution, while a corner of it had penetrated and lay imbedded in the anterior portion of the angular gyrus. The bone was removed from the brain and reimplanted in proper position, after which he became greatly relieved in his mental state, though still excitable. He has made no further allusion to his homicidal tendencies, which previously were obtrusive, and is now at work.

"Such cases of complete mind blindness are rare, and the definite localization in this case will assist in indicating in man what the anterior portion of the angular gyrus and posterior portion of the supramarginal convolution subserve. Other instances have been related, one where a combination of symptoms pointed to a lesion in the frontal lobe, and acting upon which a tumor was found pressing upon that area of the brain, from which it was successfully removed ; in the other a lesion was definitely recognized from the localizing symptoms as seated in the immediate vicinity of Broca's lobe. But even in such areas as the temporo-sphenoidal lobe, where destructive lesions may exist without localizing symptoms, one may occasionally by a process of exclusion definitely localize the lesion as seated in that part.

"12. *Lesion definitely localized as existing in temporo-sphenoidal lobe.*—A patient exhibiting symptoms of cerebral abscess, had on the left side ptosis, stabile mydriasis, paresis of all the ocular muscles, with the exception of the external rectus, without external squint. On the right side paralysis of the facial muscles, retaining power of emotional expression to a slight degree, and power to close the right eyelid by an effort of will, though it remained partially opened during sleep. He had also paresis of the right arm, which, during the few hours he was under observation before operation, had amounted to distinct paralysis. The leg remained normal. There was no diminution of cutaneous sensibility. From these symptoms it was concluded that a single lesion must be large which could affect at once the third nerve in its course and the lower half of the ascending convolutions. Second, it was clear that it was not a destructive lesion of large size in the motor area, or the crural centre would probably have been in-

volved, thus causing absolute hemiplegia. The same observation applies with even greater force to the *crus cerebri*, which must be excluded, as the effects of pressure would probably have led to more extensive involvement, and had the pressure even indirectly affected this part, it would have implicated the motor strands in the reverse order, the leg first, the face last. The tentorium cerebelli would prevent pressure downward on the pons. Third, the internal capsule could not be the seat of a large lesion, or if so, hemiplegia, with destruction of 'Charcot's crossway', would have resulted. Fourth, though the whole trunk of the third nerve was involved, paresis was alone produced, probably resulting from a degree of pressure. Fifth, the lesion was gradually implicating the motor area from below upward, and was probably occasioned by pressure and its consequences. The only place where a lesion could be situated, which could produce all these phenomena, just to that precise degree, was the temporo-sphenoidal lobe.



"It was cut down upon, and in the medullary substance of the temporo-sphenoidal lobe an abscess containing three ounces of pus was found, which was evacuated, when the whole of the symptoms vanished. Three weeks afterwards the wound was looked at for the first time and found healed."

Noting the fact that the removal of large pieces of the motor area produces permanent hemiplegia of the innervated side, Dr. MACEWEN recommends caution and the exercise of judgment in operating upon the brain. He also calls attention to the anchoring of the brain to the membranes, and of the membranes to the skull, apt to be caused by plastic effusion and cicatricial formation. The free play of the brain

within its water bed is thus impeded, and every movement causes a pulling at this point with consequent vertigo, and subsequent fits and still later encephalitis. He observes that the formation of false hernia cerebri after operations on brains in a *physiological* state is always due to decomposition and that it can be avoided in that case by aseptic measures, but the consistence of false hernia cerebri is identical with red softening of the brain, occurring in idiopathic affections in which there had been no operation, and that consequently in operations in these cases the hernia would not be obviated by asepsis.

Since 1873 Macewen has practised reimplantation of the removed fragments of the skull, aseptized and divided into minute fragments. He notes also that when the skull is intact and the ventricles distended with fluid, such as may arise in consequence of tumor in the cerebellum, the percussion note elicited will afford indications of the utmost value in early life in the diagnosis of these tumors.

The work of Macewen in this line may be summarized as follows: "Of twenty-one cerebral cases (exclusive of fractures of the skull or other immediate effects of injury) in which operations have been performed by Macewen, there have been three deaths and eighteen recoveries. Of those who died all were *in extremis* when operated on. Two were for abscess of the brain, in one of which pus had already burst into the lateral ventricles; in the other suppurative thrombosis of the lateral sinus had led to pyemia and septic pneumonia. The third was one in which besides a large subdural cyst over the one hemisphere, there was extensive softening at the seat of cerebral contusions on the opposite hemisphere, accompanied by œdema of the brain. Of the eighteen who recovered sixteen are still living, in good health, many of them regularly at work; two died, one eight years after, from chronic Bright's disease, the other 47 days after, from acute tubercular enteritis."

OPERATIONS FOR THE RELIEF OF PARAPLEGIA FROM PRESSURE UPON THE SPINAL CORD.—Certain sensory and motor phenomena due to lesions within the spinal canal have been found amenable to operation, and the spinal membranes and the cord itself can be exposed, and neoplasms and encroachments upon the lumen of the canal may be re-

moved therefrom without unduly hazarding life, as is shown by the following cases of Macewen :

“Case of paraplegia with incontinence of urine and fæces due to connective tissue tumor at seat of angular curvature of spine; completely cured by removal of tumor and laminæ of vertebræ.—In 1882, a boy, aged nine years, came under observation, suffering from complete sensory and motor paraplegia with incontinence of urine and fæces, which had existed for two years previously, but was absolute during the last eighteen months. For three years he had had angular curvature of the spine, most marked between the fifth and seventh dorsal vertebræ, for which he had been treated by extension and plaster jackets. The curvature had now become fixed by ankylosis of the bodies of the vertebræ. Treatment by extension and plaster jackets proved futile. The limbs were livid and cold, affected with marked spastic rigidity and with wasting of the muscles. The symptoms exhibited pointed to irritation of and pressure on the spinal cord, about the level of the sixth dorsal vertebra. Either of two conditions could have produced the pressure symptoms; the existence of a connective tissue tumor, as Charcot points out, occurs in such cases inside of the canal; or by direct encroachment on the canal by displacement of the bodies of the vertebræ. In the former case, the tumor could be removed on exposing the theca, by elevating the laminæ of the affected vertebræ: in the latter, the same procedure would permit the cord to expand backward, thus receding from the point of pressure. The paralysis having existed slightly for two years, and markedly for eighteen months, and showing no signs of amelioration under ordinary treatment, this operation was deemed expedient. On May 9th, 1883, the laminæ of the fifth, sixth and seventh dorsal vertebræ were removed. There was no pulsation in the portion of the cord exposed. Between the theca and the bone there was found a fibrous neoplasm of an eighth of an inch in thickness, which was firmly attached to the theca and covered about two-thirds of its circumference. This was carefully dissected off. The cord was then able to expand backward, and its pulsations, which up to this period were absent, began to show themselves, especially opposite the fifth dorsal. Twenty-four hours after removal of the pressure, the limbs had lost their livid color, were distinctly warmer, the spastic rigidity had greatly lessened, the sense of tickling the soles had returned, and that of touch had improved. The first return of movement was observed eight days after. Soon he had perfect control over his shincters. Six months subsequently, he was able to go about with-

out support. Five years afterward, he walked three miles to pay me a visit. He attends school regularly, joins in all the games, including foot-ball, and he says he feels quite strong.

"A second but more aggravated case.—In 1884, another case was seen of a somewhat similar kind, though much more aggravated, the symptoms being so far advanced as to indicate organic changes in the cord itself, which rendered operation almost hopeless. It was only on the urgent and touching appeal of the girl herself that the operation was undertaken. A dense connective tissue tumor existed between the bone and the theca, which was so firmly adherent to both that in some places the theca was elevated along with the neoplasm. The portion of the cord thus exposed was shrunk to about half its normal dimensions, and lay like an inanimate rod. After elevation of a sufficient number of laminae to expose a portion of the cord which pulsated, the pulsations were communicated to this rod, pushing it from above downward, but there were no distensile pulsations in the rod-like parts of the cord. From the whole appearance presented at the operation it was considered that there was no hope for her recovering from her paralytic state. However, ten hours after the operation, the limbs had lost their lividity, felt warmer to the touch, and patient said she experienced "a sensation as if she were dreaming that her legs were on, and hot water was running through them." From the fourth day after the relief of pressure, she had continence of urine and feces; for which alone she declared she would willingly have undergone the operation. Sensation quickly returned to the limbs, motion very slowly. Six months after, she could move her limbs freely. Eight months subsequent to the operation, she walked a quarter of a mile, stated she could perform many light duties in the house, besides attending to herself. She has since been very well and able to enjoy life.

"A third case was also successful, but two others have not been so: one succumbed a week after the operation, the other some months later to an attack of general tuberculosis. In both of these the temperature was high prior to the operation, and was subject to exacerbations, indicating an activity in the tubercular disease at some part distant from the ankylosed angular curvature. Since this experience no case has been deemed fit for operation in which the temperature did not run an even, regular and continuous afebrile course.

"Abscess in the posterior mediastinum evacuated successfully.—In connection with these cases, an abscess in the posterior mediastinum, which was exercising pressure on the heart and bronchi, and threatened life was evacuated with complete success.

"Compression of the cord from traumatism.—Another class of cases is that of localized compression of the cord arising from traumatism. Traumatic lesions are as a rule so gross and the destruction so complete, that in such, operative treatment can be of little service. Still, there are cases in which traumatism has produced localized pressure primary or secondary which can be relieved.

"Paraplegia from traumatism cured by elevating connective tissue tumor and depressed arch of twelfth dorsal.—From a coal pit accident, a man twenty-two years of age received a severe injury to the spine, at the level of the lower dorsal vertebræ, which caused absolute motor paralysis with incontinence. There was marked hyperæsthesia of the affected parts, which increased in severity during the first three weeks, so that he could not bear to have the floor shaken or his limbs touched. Between the third and fifth week a rapid change took place. At the termination of that period, the muscles of the lower limbs would not respond to electricity, they had become so shrunken and wasted that the contour of the bones stood prominently out and notwithstanding massage of the limbs since the cessation of the pain, the flexor muscles had markedly contracted causing drooping of the feet and toes, and fixation of the joints. Later, the skin over the bony prominences became red, pressure points and bed sores formed irrespective of the most scrupulous attention, the urine became ammoniacal and his temperature ran up. It was evident that a fatal issue was imminent, unless an attempt to relieve the pressure on the spine was at once made. In February, 1885, this was done. The lower dorsal and first lumbar were exposed. The arch of the twelfth dorsal was fractured and slightly depressed, and between it and the theca there existed a connective tissue tumor, measuring nearly quarter of an inch in antero-posterior diameter, and extending from the eleventh dorsal to the second lumbar vertebra. Both above and below the twelfth dorsal, the tumor gradually shaded off to about one-half of its thickness at that point. It was confined to the posterior aspects of the canal. This tumor was carefully dissected from the theca. The same night there was a distinct improvement in the warmth of the lower limbs. He began to move his toes on the third day. A month afterward the contractures of the tendons about the ankle and feet were extensively tenotomized to relieve the structural contraction, after which the motor power rapidly increased. He was soon able to walk with support which a year subsequently he discarded, and now can move about with perfect ease."

By the work of Macewen Seguin, and Weir, here noticed, following

that of Horsley, v. Bergmann and others, certain portions of the brain and spinal cord may be said to have been brought completely within the domain of operative surgery. The subject of cerebral localization must however be still further extended before complete freedom of operation is attained, and meanwhile the surgeon looks to the physiologist for still more additions to our knowledge in this direction.

JAMES E. PILCHER.

BERGMANN ON THE SURGICAL TREATMENT OF DISEASES OF THE BRAIN.¹

This paper is interesting not only from a surgical, but from a purely medical standpoint. It is an attempt to test a question which is fast becoming of vital moment, whether the general medical practitioner in calling upon the surgeon to operate in a given case must not be ready to exhibit as great an acquaintance with two tenets of modern surgery as his operating colleague. The time is past when the surgeon operates because the procedure is favored by a colleague who looks upon the knife as a mere mechanical agent devoid of all responsibility for danger or meddlesome interference because it is guarded by the paraphernalia of antiseptis. The careful exclusion of a certain class of cases from the domain of the surgery of the brain and a perfection of the methods applicable in fit cases is the true advance of surgery in this field. If in recent times the necessity of trephining in deep seated abscess has become urgent, it is because of two propositions: (1) The encapsulation of these processes and (2) the difficulty of their recognition. It is only in the acute abscess occurring on the surface of the brain, that we find no so-called limiting zone. These abscesses are traumatic in origin. The chronic brain abscess even if bounded by a so-called capsule is still liable to enlarge. The only result of non-interference in these abscesses is rupture into the ventricle and death. True, isolated cases are found where an abscess has discharged externally (Mac Leod), but these are so uncommon that they must be dis-

¹Die Chirurgische Behandlung von Hirnkrankheiten von Prof. E. VON BERGMANN Arbeiter aus der Klinik, Berlin, 1887.

regarded. The diagnosis of brain abscess is inseparably linked with the etiology. A brain abscess is never idiopathic: it is always connected with a trauma which existed as an open wound in the soft or hard parts of the head, or it is traced to some other suppurating process in the skull—frequently from a suppurating ear. There are also metastatic and tubercular brain abscesses. The metastatic abscess, generally multiple, appears in the course of pyæmic processes and concomitant with abscesses in other organs of the body. They very rarely appear singly in the brain. Virchow first described the appearance of brain abscesses in subjects suffering from affections of the lungs. Näther and Senator have since then recorded interesting cases belonging to this class. Gangrene of the lung, empyema, bronchiectasis furnish their contingent. There is little in these cases to encourage operative interference. The diagnosis must in cases of this kind lie between abscess and tumor. The operative therapy, however, is still out of question. The tuberculous abscess has reached in isolated cases the size of traumatic abscesses (Fraenkel, Wernicke.) A conglomerate tubercular mass may liquefy at its center, and on an examination of the fluid (Fraenkel) an immense number of micro-organisms may be found. The wall of such abscesses may be studded with tubercle. There is in these cases very little to encourage operative interference. We can only hope for a result from operative measures in cases of traumatic abscesses and those resulting from suppurative ear processes and suppuration in the bones of the skull. The diagnosis in these cases must be early and positive. It may be noted that in all traumatic abscesses there must have preceded an open wound communicating externally. In abscesses resulting from suppuration of the ear we find as a rule a long standing otitis media, sometimes dating from childhood (Exanthemata.) In the majority of these cases the abscess is located in the temporal or occipital lobe. In statistics by Barr, 55 of 76 cases of abscess were situated in the temporal lobe, but the facts relating to encapsulation or the contrary are not mentioned. It is interesting that the pus was of a fetid character in 69 of these cases. It must not be overlooked that these cases of suppurating otitis may give rise also to meningitis and thrombosis of the cerebral sinuses. Compared to the

role of abscess from ear troubles that resulting from other suppurating processes in the cranial bones is insignificant. In studying the symptomatology of abscess of the brain those traced to the ear are always insidious in their invasion. Looking at the symptomatology of brain abscess in its entirety we find it divided into three distinct groups, those manifestations due to the suppuration, those which may be traced to pressure and finally those pointing to their localization. If after the healing of a fracture there is a slight evening rise of temperature with periods of complete absence of the same we may begin to suspect suppuration, especially if this fever, however, can be accompanied by symptoms of pressure. In otitis media occasional fever has little significance; it may be traced to the ear trouble. The pressure symptom found by the author in most of his cases was headache, aggravated by the fever or any of the conditions (alcoholic indulgence) which increase intra-cranial pressure. The pain corresponds in cases to the exact location of the abscess, and is brought into prominence by slight percussion. Somnolence and even coma or Cheyne-Stokes respiration are recorded in isolated cases (von Bergmann), while optic neuritis, constant in cases of tumor, is rather an unfrequent symptom of abscess. In studying the localization of brain abscess we will obtain positive data if the process is situated in the motor tract. It may exist in the temporal and frontal lobes and yet give little evidence of its presence. Moreover the symptoms will vary with the extent of cortical (ganglionic) substance compromised. Large areas, the greater portion of a lobe or hemisphere, may be occupied by an abscess without serious disturbance. The grey matter being intact, the fibres of conduction are simply pressed aside, and symptoms of localization are absent, if conductivity remain intact. Temporary suspension of conductivity may result if the surrounding brain tissue become œdematous. This latter condition is due to pressure and is immediately relieved upon the evacuation of the pus. The pareses resulting from the above conditions invariably disappear. As stated, the mass proper of the frontal lobe may be destroyed in the absence of distinct symptoms of localization; yet if the cortex be involved, we at once have manifestations of disturbance of speech, the functions of the eye, facial paresis,

etc. In a case of Wernicke hemianopsia pointed clearly to the lesion, whereas in Janeway's case symptoms of localization were absent in an abscess situated in the temporal and occipital lobes. If in the course of an otitis we have supervening deafness in the sound ear there is a valuable point obtained for localization. Abscesses of the cerebellum more than any others have escaped observation or diagnosis. Here vertigo, cephalalgia, indifference, somnolence may aid diagnosis. The object in modern surgery is not so much to discover and localize the abscess *per se* as to eliminate the operative from the non-operative cases. As minor details the author deprecates the irrigation of brain abscess. The trocar is preferred to the knife as an exploring agent. The diagnosis in these cases leaves more to be desired than the technique.

The scope of surgery is more narrow in the domain of cerebral tumor than in that of abscess. The surgeon must not only be cognizant of the existence of the tumor but also whether it can be entirely removed with safety. Tumors originating from the cranial bones have been safely removed, even when large areas of bone were involved, but the isolated cerebral tumors are not so amenable to treatment. They are either in the form of diffuse infiltrations, or they may be distinctly encapsuled, thus admitting of enucleation. In a statistical compilation of brain tumors (White) it was found that there is one tumor of the brain to every 59 post mortems. Of 100 brain tumors 45 were tubercle, 24 glioma, 10 sarcoma, the remainder were scattered among carcinomata, cystomyxoma, etc. As isolated tuberculosis of the brain is rare, tuberculosis, as also syphilis, does not come under the class of operative cases. Diffuse infiltrations must also be excluded. Of these 100 tumors classified post-mortem 9% might have been successfully removed. But the clinician meets another obstacle; he can only remove a growth which manifests itself by symptoms. Otherwise the growth does not exist within the possibilities of his diagnosis. The manifestations most positive are those traceable to the existence of a growth in the motor tracts. Even here, if the tumor be very large, it cannot be removed without great danger of acute cerebral œdema, even if well encapsulated. The removal of a tumor in the comatose stage of the disease

is hopeless. The field therefore for surgery in these growths is very narrow. Given the diagnosis and localization we must look upon trephining or chiseling as explorative until we find if the growth can be safely removed without subsequent cerebral œdema. Our technique here is defective and leaves, a great many difficulties to be cleared by future work.

Still more confined than the above is the scope of surgery in the field of epilepsy. Reflex epilepsy, where the aura proceeds from an injured peripheral nerve of the scalp, is the rarest of occurrences. Surgery must therefore confine itself to those cases of cortical epilepsy where the irritation proceeds from a cicatrix resulting from an injury to the brain cortex. We operate only in the hope of removing a palpable cicatrix of the brain convolution. Surgery today cannot interfere in cases of neuroses. Von Bergmann reiterates that surgery only holds out a hope of success in those cases where the epilepsy begins in a manner exactly similiar to that met with in experiments upon animals. The convulsion is initiated by the contractions of special groups of muscles. These contractions spread to those muscles of the opposite side of the body, and finally became general. Finally we have the typical pareses and paralyses in the muscles convulsed. Confining ourselves to the cases where special muscular groups are first affected (Jacksonian epilepsy) surgery will attempt to remove that part of the brain cortex (nervous centre) the irritation of which is manifested in the contractions of the muscles first affected.

The author would advise operation in those fixed forms of traumatic epilepsy having the exact Jacksonian type. In conclusion the tone of von Bergmann's paper deprecates that tentative spirit in brain surgery which operates with the vague idea of holding out some hope to the unfortunate sufferer by interference not built upon exact diagnosis by physiological experiment.

HENRY KOPLIK.

THE ETIOLOGY OF FRACTURES OF THE SKULL.

Dr. Arthur W. Hare considers this subject in a lecture delivered to

the class of operative surgery in Edinburgh University. (*Lancet*, Feb. 4th, 1888).

The same laws govern large and small forces alike, and, therefore, Felizet's proposal to divide fractures into those produced by great violence and those caused by small is not justifiable. But the *way* in which the force is applied is very important. The results of a diffuse blow differ from those of a concentrated one. In a diffuse blow there is less tendency to fracture at the seat of application than at some distant point. It is therefore to diffuse blows we must turn for evidence as to the influence of its special structures upon the form and direction of the resulting fracture. The theory of contre-coup applies to spheres of uniform strength and of regular structure, but could scarcely apply to a construction like the skull. It was promulgated by Saucerotte, who maintained that the vibrations set up by a blow travel in all directions through the walls of the cranium, and are concentrated to a focus at the opposite point of the skull from that struck, at which point a stellate fracture is produced.

This theory has now been largely abandoned, chiefly owing to the researches of Aran, who, as the result of experiment, came to the conclusion that fractures of the base occur by the radiation of fissures from the point of application of the force. The fissures pass to the base and involve it in the fracture, taking according to Aran, the nearest route, but according to Felizet, in the majority of cases the fissures do not take the nearest route but pass downwards, in the intervals between the bony buttresses described by Hilton, where there is a greater tendency to fracture than in the costæ themselves. It is well known that Aran's experiments tend to prove that diffuse blows on the front part of the vault caused fracture of the anterior fossa, those on the middle part fractures of the middle fossa, and those on the back of the head, fracture of the posterior fossa. Sir Prescott Hewett found that a study of cases at St. George's Hospital confirmed Aran's statements.

But there are certain series of more recent experiments whose results seem to throw some doubt upon Aran's theory, and upon them has been based another theory which appears at least equally well to

explain the actual appearances in such cases. In 1872, Schwartz published the results of a series of experiments on the heads of cadavera, in which he found that on the application of force to the side of the skull fracture of the base constantly occurred in the middle fossa, and in a direction parallel to the petrous portion of the temporal bone, and thus parallel to the line of force producing it. Similarly if the force be applied to the frontal or occipital region, the fracture traverses the base diagonally; in other words in each case the line of fracture is parallel to the line of force. These results after remaining comparatively unnoticed for several years, were put to the test by Meserer, and in 1881 by Hermann, and in both cases substantially the same results have been arrived at. The former expresses his opinion as follows: "that fractures of the base always occur in the direction of the force applied, or at any rate parallel to it, and thus are not looked upon as the result of radiation, but of compression or bursting." In illustration of this view he makes use of the following illustration: "If a hollow sphere be subjected to pressure, the breakage either occurs immediately at the point of pressure, or by bursting at the most distended part."

An explanatory diagram of von Wahl's is given.

Hermann found experimentally that by applying gradual increments of force, one could watch the fracture develop itself, commencing as it always did, in what represented the equatorial zone of the base, *i. e.*, midway between the points of pressure, and extending as more force was applied in both directions parallel to the line of force toward the poles, at which it was applied, until he had obtained exactly the same appearances as those upon which Aran based his radiation theory, viz., that from one of the points of application of the force a fissure ran toward the base and involved it. In this way Hermann attempts to prove that the appearances produced in Aran's experiments were due to the excessive amount of force used, which first shattered the base and then led to the formation of the radiating fissure leading to the point of application of violence. Von Wahl in his pamphlet accepts this view, and figures sixteen cases of fractured base from the surgical museum of the university of Dorpat, each accompanied by short notes of the case, which in the main bear out his views. He specially draws atten-

tion to one, which can hardly be explained on the radiation theory, as there are fissured fractures of the base quite isolated, having no radiating fissure in connection with them, passing toward the point of application of the force ; although in this case the history points to conditions exactly similar to those used by Aran in producing his experimental results—viz., a fall from a height upon the left frontal region.

Dr. Hare has within the last twelve months had a similar case in his own practice in which a blow on the lateral frontal region was followed by symptoms suggesting fracture of the base. In this case he diagnosed a fissured fracture, and defined its direction in terms of the law just mentioned. A month after the accident the diagnosis was confirmed by a post-mortem inspection, and an isolated basal fissure was discovered, involving the anterior and middle fossæ, but with no prolongation to the part of the vault struck. An illustrative drawing is given. The author, therefore, considers that we must adopt the views of von Wahl, that the fracture occurs in the line in which the force is applied or parallel to it. This, however, with certain reservations, for the experiments of Meserer and Hermann did not extend to an investigation of the remote effects on the base from injury to the vault ; and it is only in the case of forces applied to the lowest segment of the vault, or more properly to the edges of the base, that the theory of parallel cleavage is found to hold true. The holding of this theory in no way detracts from the value of Aran's experiments ; it accepts and appropriates his results, but slightly modifies his interpretation of certain of them. This modification would be a triviality were it not for the importance of the clinical issues involved, for if we can by applying the law of parallel cleavage, define the course of cranial lesions, much has been done toward removing that uncertainty which is the great bar to logical and successful treatment.

Dr. Hare finally sums up his views of the results of diffuse blows on the skull as follows : Diffuse blows produce their chief effect at a distance from the point of application ; those struck on the vault produce fissured fractures in the corresponding segment of the base ; those struck on the periphery of the base produce fissured fractures of the base of the skull parallel to the force applied.

C. B. KEETLEY.

ON ANTISEPTIC METHODS AND OTHER POINTS IN THE
PRACTICE OF PROFESSOR VON VOLKMANN.

A residence of four months in Halle and a daily attendance at the clinic afford the writer the opportunity of submitting to the readers of the *ANNALS OF SURGERY* some account of the antiseptic methods employed by Professor von Volkmann, and a brief notice of some of the more striking points in the treatment of surgical cases, especially of fractures and diseases of the bones and joints, which that distinguished surgeon's genius and experience have led him to adopt, which, too, in many instances, have resulted in signal successes. That this notice confines itself largely to details, individually minute, but capable of yielding great results as a whole, is no ground for apology, but rather of justification. It is now recognized by all that the large measure of success which has followed bold operative procedures, and the proud position which surgery has attained, are due, not so much to mere manual dexterity, as to a thorough appreciation of what is known of the life history of micro-organisms, their universal presence, the remarkable facility with which they are capable of effecting an entrance into the economy, and the disastrous consequences, or, to put the question briefly, the exclusion of all possible sources of sepsis.

Although it is not permissible for the writer to enter into actual statistics, yet it is the boast of this clinic that, if patients have been treated from the first within its walls, in no single instance has pyæmia supervened after operation during the last six years. Pyæmia is not unknown here, but when it has occurred, it has been in those whose wounds were foul when they obtained admission. But even then it has been limited to the individual case, and has not spread; and during my residence here, it is possible for me to add, that erysipelas has been conspicuously absent. One reason of this is readily apparent. The dressing of cases is not entrusted to mere students, who are still learning the details of antiseptic practice while they are, in actual attendance on patients, but to thoroughly trained assistants who are well acquainted with the necessary routine, and have also passed through a course of bacteriology.

The method adopted is one which, as far as the practical training of

the ordinary student is concerned, has many drawbacks, but it affords the greatest possible benefit to the patient. Students, as such, are not allowed to come in actual contact with the latter. They must attend the clinic daily and note the preparation made for operation day by day, and from time to time undergo a cross-examination in the routine of antiseptic practice, until the time arrives when some of them seek the position of *Voluntär-Arzt*, and later, of Assistant. These latter are chosen by the professor himself, and, after passing through the Out-patient Department where they apply all their lately acquired knowledge, pass on to the care of cases in the wards. Those students who cannot afford to wait for three or four years after their qualification must go into private practice with only a limited practical knowledge of the surgical part of their profession.

We will now follow the course of an operation so far as it concerns the limits of this article. And firstly, let us note the procedure of the operator himself and his assistants. Taking off their coats and rolling their shirt sleeves well above the elbows, they thoroughly wash their hands and the exposed parts of their arms with a special soap, a sand carbolic soap, which rapidly removes all traces of dirt, or of previous operations. The nails are then carefully attended to, and the nail brush and nail cleaner are in constant requisition. There is no more serious error than for a student to assist at an operation with imperfectly cleansed nails, and such must inevitably be the case when he is called upon, first, to expose his hands to the caustic action of the carbolic spray, and then to apply plaster-of-Paris jackets and splints. Here the latter duties are performed by a special set of assistants who are not, during their term of office, allowed to assist at operating.

A white calico dress is then donned, somewhat resembling those worn by visitors at fever hospitals. It reaches from the neck to the feet, has short sleeves, and generally buttons behind, the object of the latter precaution being to prevent access of the hands to the pocket, a habit which a moment of leisure irresistibly induces in some people; it was remarked to me by a professor that pockets are usually mines of septic wealth. The calico dress is used for one day only, or for one case, if that should happen to be foul; it is then sent to be washed.

The hands and arms are then allowed to soak for about half a minute in corrosive sublimate solution, 1 in 1000. This procedure involving time and labor and an appreciable risk of mercurial absorption, differs widely from the practice of merely washing the hands in a cursory manner, and then dipping them in a carbolic acid solution for a few moments, and the constant use of an old coat which has seen much service amongst all kinds of surgical cases, septic and aseptic—a practice in vogue not so long since in some large hospitals, amongst the students and dressers.

The preparation of the patient to be operated on is the next matter. The skin over a large area is first well washed with carbolic soap, and scrubbed if need be, and then it is shaved, the latter detail applying to all parts where hair is found, and not merely to the head, face and genitals. Then the skin is further freed from any adhering greasy material, such as sebaceous secretion, by rubbing with ether on lint, and finally undergoes a complete irrigation with sublimate solution.

The instruments are placed in a 5 % solution of carbolic acid for a few minutes previously. When not in use, they are kept in an air-tight glass case open to everybody's view and free from dust. The perchloride of mercury solution is not used for instruments, as a deposit of mercury readily forms on them, which leaves a black mark along the edge of the incision. Neither are they nickel-plated to avoid this, the plan having been tried, but it proved to be a failure, as it was found the nickel readily chipped off, and so left irregularities which rendered them difficult to clean and very liable to lodge foreign matters. In the Frauen Klinik the knives for ovariectomy are similar to those used in bacteriological researches, the cutting part and the handle being made from one piece of steel.

One important point with regard to metallic and other catheters and sounds. They are always kept in a glass jar, containing a 5 % solution of carbolic acid in glycerine, and it is found that glycerine is a more reliable medium than oil, and answers all the lubricating purposes of the latter.

It is well, too, to note that when a catheter is to be passed, the interior of the prepuce and the glans and the meatus urethræ are care-

fully cleaned and irrigated with a solution of hydrarg. perchlor. 1 in 5000.

An enumeration of the antiseptics employed and their special uses can best be made here. Corrosive sublimate, 1 in 1000 for the hands of operator and assistants, and for cleaning the skin, also for irrigating the wound, provided it does not involve serous cavities or mucous surfaces, or is not of large extent.

For the former boracic acid solution 3 %, or salicylic acid $\frac{1}{3}$ % is found appropriate, and in all cases involving the buccal and rectal mucous membranes. After an excision of the rectum the 1 in 1000 sublimate solution was employed, and the operation was followed by symptoms resembling the onset of acute peritonitis. At the autopsy there was no evidence of wound of the peritoneum, and no morbid changes were discovered sufficient to have caused death: so it was deemed quite within the range of probability that death was due to mercurial poisoning. Permanganate of potash solution (Condy's fluid) is never used, as it is of feeble germicidal power, and readily parts with such efficacy as it may possess. Carbolic acid solution 3—5 % is employed for instruments, sponges, 10 %, for wounds of large extent, and for cleansing foul sores, such as varicose ulcers. A very weak solution, $\frac{1}{2}$ —1 % is sometimes employed for the peritoneal cavity and for hernia cases.

With regard to the sponges. There is a set for each day of the week, lying in a 10 % carbolic solution, in seven porcelain jars, and each day has its own appointed jar. In the morning the jar is placed in the operating theatre, and in the immediate vicinity is a tin box securely locked, with an aperture in the lid, and containing a 10 % carbolic acid solution. As the sponges are used they are dropped into the tin box, and so can only be used for one operation. When the day's work is over, an assistant unlocks the tin box, and taking out the sponges, thoroughly washes them in hot water, and replaces them in the jar from whence they were taken during the day. This jar is then put by until the corresponding day next week, the sponges lying all that time in the strong solution above mentioned. The same procedure is repeated every day.

In the course of an operation the wound is gently irrigated from time to time, especial care being taken to wash away blood clots. During an amputation at the moment of sawing the bone a gentle stream follows the track of the saw. The object of this is said to be to remove the bone dust formed, but, in the writer's opinion, it serves a better and less chimerical purpose. Of all instruments a saw is most difficult to ensure complete cleanliness in; it is almost inevitable that some debris will cling to the interstices between the teeth.

Such material will readily infect the medulla of the bone as it passes through, but by irrigation at that moment the danger is reduced to a minimum. This precaution will perhaps serve to explain the absence here of separation of a small sequestrum from the bony stump, which is not an infrequent complication of the treatment of amputation wounds.

Ligatures are made of silk and catgut, the latter having been soaked in juniper oil, which renders them tough but readily absorbable. Both kinds are kept in glass boxes and the various sizes on reels, the free end passing through an aperture on the side of the box, with the number of its calibre printed near the aperture. In the glass box is placed sufficient carbolic acid solution to cover the reels.

This is a simple and efficient plan, and serves to avoid delay which sometimes ensues, if the ligatures are kept in short lengths in a glass jar, and become entangled when wanted.

Drainage tubes are of pure rubber, and are kept in glass jars soaking in an antiseptic solution. In all operations the spray is discarded. It is found that all the cases do well without it.

A few words as to the dressings. The wound having been carefully cleaned and freed from blood clots, one or other of the following gauze materials is applied: carbolic gauze, or benzoic acid gauze 4%, and in the case of deep wounds, such as a lithotomy or an excision of the rectum requiring tamponing, iodotorm gauze. In case of plastic operations, and when it is desirable to ensure primary union at the earliest possible date, green protective is applied.

The amount of gauze placed over the wound is small and only sufficient to cover it and about three inches of the surrounding skin, and above the gauze is placed moss.

Large pads are made from wald-moss in this way. The moss is gathered in the forests around Halle, and thoroughly freed from dirt by repeated washings in distilled water. It is then dried in ovens and sent to the clinic. There it is made into pads of sizes according to a definite scale, and finally flattened beneath the rollers of a mangling machine.

The moss-pad, which is always very large in proportion to the extent of the wound, overlapping it at least 4 or 6 inches in every direction, is firmly fixed by means of light loose-textured bandages, which are less expensive, and adapt themselves more readily, than those made from calico. Should the discharge find its way through the dressings, some iodoform is sprinkled on and another pad is bandaged on. The advantages of such a dressing appear to be, firstly: moss is a great absorbent of moisture, far more so than cotton wool, carbolic tow, Gamgee tissue and the like. In addition, when wet, it does not form a sodden mass like the substances above enumerated. Now, one of the main factors in the development of micro-organisms is the presence of moisture, and that substance which by the most rapid absorption will prevent discharge coming to the surface of the dressings, fulfils many of the requirements of a perfect dressing. Secondly, it acts as a filter, and filters off all micro-organisms from the air, in the same way as cotton wool in a test-tube cultivation, and, lastly, it is exceedingly cheap—an important consideration in the management of large hospitals. For carbolic gauze to answer the requirements of large absorptive capacity and filtration, it must be applied in layers of 16, 20, 24 thicknesses, on account of its loose texture and the paraffin which enters into its composition. Professor Volkmann's successful method of dressings rests on this fact. He has assured himself that he has left his wound and the *surrounding skin* for a large area perfectly free from septic, and then it is only necessary to provide such a dressing as will prevent contamination from without, and this is found in a small quantity of carbolic gauze, and a large amount of wald-moss.

The point which to my mind needs emphasis is, that not only the site of operation, but that all surrounding parts for a large area, should be germ-free all through the course of the case. Of what value is it to

pile on costly antiseptic dressings when by so doing you only form a moist chamber for the development of germs situated on the skin beneath them, and with ready access to the wound. The efficacy of the method used by von Volkmann is very great. In no case have I seen suppuration, nor has a case of erysipelas occurred during my residence here. After all, an operator must have assistants upon whom he can rely absolutely to carry out all these minute details in every case. If the assistants must be looked after by their chief, and so to speak, cross examined constantly by him, then the system is apt to break down, on account of the trouble and loss of time it involves, and in a large hospital with two regular operating days a week, and many operations on that day by different surgeons, each waiting his turn, time is an object.

There is, however, here, but little or no loss of time, as each assistant is ready to act his part as soon as the patient is brought in, while the professor proceeds with his account of the case. In a large teaching hospital, where students must be practically taught, the writer would advocate that a short course of bacteriology should form a part of the surgical curriculum, and that each student should put into practice what he has learned, first of all fully in the outpatient department, and finally in the ward. It is inevitable that all students are not equally reliable, and it is noticeable that outbreaks of erysipelas and pyemia are usually limited to one surgeon's beds and to one particular set of cases attended by one dresser. It may be that it is an old coat, or carelessness in washing hands that carries the contagion, but certain it is that there is some one attendant who has not grasped the fundamental principles of antiseptic surgery.

A. H. TUBBY.

INDEX OF SURGICAL PROGRESS.

GENERAL SURGERY.

I. Antiseptic Surgery at the Hospital de la Salpetriere; Use of Boiling water. By M. TERRILLON. (Paris). The writer insists particularly upon the value of disinfection of instruments by boiling water. Pasteur's experiments first, and afterwards Roux's have demonstrated that water at 100° C. destroys all pathogenic microbes. It is true that the spores resist this temperature, but they lose the faculty of developing rapidly, and, besides, a second immersion in boiling water some days afterwards will kill the microbes to which the germs have given origin. Lastly, as a matter of fact, all the surgeons who have made use of this means of disinfection have had marvellous results. After every operation the cleansed instruments should be plunged for ten minutes into boiling water, and before the next operation, they should be again immersed for ten minutes.

Water at 100° C. serves also for the disinfection of silk. After ten minutes boiling, it is placed in bottles filled with Van Swieten's solution or carbolic lotion. At the moment of use it is once again plunged into boiling water.

M. Terrillon covers the points of suture with a layer of iodol or iodoform ointment, and strongly recommends the practice.—*Le Progrès Médical*, May 12, 1888.

C. B. KEETLEY (London).

II. Antiseptics in War Time. By Dr. E. ALBERT. (Vienna). During the war between Servia and Bulgaria only 2% of the wounded succumbed after being treated antiseptically. This contrasts very favorably with a death rate of 20%, which used to occur when antiseptics were not used, and shows how urgent it is that such treatment should be the rule with armies in the field.

An antiseptic dressing should be applied on the field of battle, as soon after the wound has occurred as possible. Securing the immobility of the injured part should only be seen to after this *sterilization* has taken place. A larger number of surgeons are required in the first line and on the field of battle. There is no doubt that the secret of success in the antiseptic treatment of gunshot wounds is its early application.—*Le Bulletin Médicale*, Sept. 28, 1887.

LEONARD MARK (London).

III. A Novel Extension of the Uses of Cocaine. By E. HURRY FENWICK F.R.C.S. (London). The author suggests that it may be used as a therapeutic, diagnostic and prophylactic agent. He first was made aware of its extended value by accident. A gentleman suffered constant pain for five years in his face, limbs, and urethra, consequent on an attack of gonorrhea. In order to examine the urethra with the endoscope, a few drops of a 20% solution of cocaine were injected into the urethra. In about 60 seconds the neuralgia in his face and limbs completely disappeared. He made a complete recovery. After a number of experiments on frogs Mr. Fenwick concluded that cocaine was possessed of considerable reflex inhibitory powers. 1. The application of cocaine temporarily abolishes the consciousness of weak stimuli, such as would correspond to slight nerve irritations, neuralgias, etc. 2. The application of cocaine has no power whatever over stronger stimuli, such as would correspond to the pain of carcinoma, inflammation, etc. His clinical experience so far confirmed the above conclusions. He thus formulates the matter: If pain in any part of the body be due to a slight nerve irritation of an unimportant character, a cocaine injection into the urethra will quickly relieve it. If, on the contrary, the pain is due to severe nerve irritation, a cocaine injection will not relieve it. These facts open a large field in the differential diagnosis of the causes, as well as the just estimation of the amount of pain experienced by neurotics and others. I have used it largely in the diagnosis of urinary diseases. For instance, in cases of renal pain, if a urethral injection of a 20% solution of cocaine immediately relieves a pain in the kidneys, I diag-

nose a transient or unimportant cause for that pain, such as congestion, uratic urine or grit, colonic pressure, etc. If, however, the renal pain is uninfluenced by such an injection, I give a more guarded prognosis, and this has been several times verified by the subsequent passage of a small stone, or, as in one case, by the development of a renal carcinoma.—Lastly, there is every reason to believe that it will prove of value as a prophylactic agent in warding off, by inhibition, the untoward effects of reflex renal flooding after operation upon the bladder and urethra.—*Lancet*, May 5, 1888.

H. H. TAYLOR (LONDON).

IV. Some Remarks on Erysipelas of the Face. By PROF. S. JACCOUD (Paris). The infectious nature of erysipelas is principally shown by its mode of defervescence, which is always sudden, unless there are complications. This points to a sudden inertia of the causes which brought about the fever, and such a condition can only be connected with infectious agents.

As regards complications, the most important are those of the heart, and those of the kidneys. Lesions of the heart generally make their appearance on the second or third day, most frequently in the shape of mitral endocarditis, characterized by a systolic murmur at the apex. In nine cases out of ten they disappear gradually.

The gravity of the kidney complications has been very much overrated, and it has often been maintained that albuminuria is always present in erysipelas, and the proper relationship between albuminuria and nephritis has been ignored. The two things are not allied in every case. Observers were led into error by finding affections of the kidneys in all those patients who died from erysipelas after having had albumen in their urine, and they supposed in consequence, that there must be a similar state of things, but of slighter degree, in those who did not die. Stress was laid upon the elements found in the urine, white and red corpuscles, epithelial casts, microbes. As these are not to be found in every case, one cannot conclude that nephritis is always the cause of albuminuria. In a case M. Jaccoud reports, accompanied by albuminuria, cure took place in eight days. Some cases were

found in the urine but no cells nor microbes. If this were nephritis could it have disappeared entirely in three days? Such a condition is to be explained by the suppressed action of the skin and by the high temperature. Other cases are to be explained by some irritation going on in the kidneys. It is only when this does not disappear rapidly that any fear need be entertained of its degenerating into chronic nephritis.—*Gazette Médicale de Paris*. Nov. 26, 1887.

LEONARD MARK (London)

V. Extensive Carbuncles Treated by Erasion; Rapid Convalescence. By EDMUND OWEN (London). The patient, a thin, unhappy looking-man. æt. 55 years, a carpenter by trade, was admitted on Dec. 9. 1887, for carbuncles over each shoulder blade. They had been developing for about three weeks. The long diameter of the right sore was five inches; the skin was much undermined; a large central slough was bathed in offensive pus. The left sore was rather larger than the right, but the slough was more adherent. The man was utterly prostrated. Under ether, the sloughs were removed and the sores scraped out, the undermined skin was trimmed and the surface which it covered thoroughly cleaned out with Volkmann's spoon. The wounds were then washed with 1:1000 sublimate solution, and dusted with iodoform and covered with moist perchloride gauze and pads of blue wool. The man made a rapid recovery. The author in some remarks affirms his belief that anthrax is, in its pathology, closely allied to certain cases of acute osteitis, or periostitis, in which inflammatory distention of capillaries determines the death of a portion of bone, and since surgical interference is indicated in these diseases, in order to diminish the risk of secondary abscesses and pyæmia, and improve the chance of reproduction of new bone, so the radical treatment of carbuncles is called for in order to convert a septic and painful mass into an aseptic and painless one, and by the removal of the decomposing slough to lead to the shortening of the disease. The author referred to a previous paper on the subject by Teale of Leeds.—*Lancet*, March 24, 1888.

H. PERCY DUNN (London).

HEAD AND NECK.

I. The Factors that Determine Hypertrophy of the Skull in Mollities Ossium, Osteitis Deformans, Rickets, and Hereditary Syphilis. By W. ARBUTHNOT LANE, M.S., F.R.C.S. (London). In this paper Mr. Lane attempts to prove that the hypertrophy of the skull in the above diseases is mechanical in its causation, being dependent upon and remedial of the softening which precedes it. His theory is that nature makes attempts to protect, and shield the brain in consequence of its important nature, and however little capacity there is for repair, almost the whole of it is concentrated in strengthening and thickening the brain case. "In diseases such as osteitis deformans, rickets, and congenital syphilis, the function of sheltering the brain has the first claim upon the fund of repairing capacity, the remainder being distributed among the several other portions of the osseous system in proportion to the importance of the demand of each." His views are opposed to Rindfleisch who describes the bones as being first decalcified and then converted into fibrous tissue, the fibroid material subsequently undergoing a mucoid change. His grounds for doing so are the following: "In an early case of mollities ossium I found that the spaces in the softened bone of the skull cap were much smaller than those in that portion of the bone that was yet hard, and this transition for the comparatively large spaces in the normal diploe to the very fine reticular net work in the soft pliable bone was very distinct in and about the spreading margin of soft bone. If the process, as explained by Rindfleisch were true of the skull, we ought to find the spaces in the soft bone filled with mucoid material, and much larger than those in the nearly normally hard bone. It is difficult to understand the application of his theory to the thick soft skull seen in an advanced case of mollities. I examined sections made through the hard and the soft pliable portions of the vault of the skull, and I found associated with the general decalcification a deposit of decalcified lamellæ of fibrous tissue upon the enfeebled bony trabeculæ gradually diminishing the calibre of the intervals between them. The endosteal deposit of a decalcified strengthening callus is followed at a later date by a similar periosteal deposit on the other surface of the

skull. I think that Rindfleisch saw the same microscopical appearance as my sections presented, but he regards the fibrillation and cell deposit lining the decalcified trabeculæ as being another downward grade in the process of its conversion into mucoid material, and a stage of degeneration, while I regard the fibrous tissue as *an effort to strengthen and repair*, by a callus, which is, owing to the recuperative power in the individual, unprovided with lime salts."—*Brit. Med. Jour.*, vol. ii, 1887.

II. II. TAYLOR (London).

II. Case of Axe Wound of the Skull. By DR. HEINRICH I. RODZEWICZ (Nijni-Novgorod Russia). An old, but hale and sound rustic parson, æt. 56, was struck on the head with an axe. A couple of hours later the writer found the old man lying in bed quite conscious and quiet. He got up and walked with some support to a sofa near a window to be better examined. About the middle of the right parietal region there was present a clean cut, slightly gaping wound measuring $4\frac{1}{2}$ cm. in length and penetrating down to the brain which could be seen through the gaps in the dura mater. On clearing the surface of the latter, two fragments of the inner table of the parietal bone each about $2\frac{1}{2}$ cm. long were found and removed. There was but a trifling hæmorrhage. The edges of the skull fissure were slightly everted. Neither vomiting nor any cerebral symptoms, except a severe headache were present. Having cleansed the whole injured area with cotton-wool soaked in an alcoholic solution of salicylic acid, the writer stitched the scalp wound with six carbolized silk sutures, applied salicylic cotton-wool, and above it a large lump of snow in a table napkin. Contrary to all expectations, the old man made a good recovery. When visiting Dr. Rodzewicz about three months later, the patient was quite cheerful and only complained that his hearing on the *left* side had grown worse after the accident. His wound was found to be completely united.—*Rüsskaia Meditzina* No. 38, 1887.

III. Compound Comminuted and Depressed Fracture of the Skull, with Lacerated Wound of the Brain; Trephining; Recovery. By DR. IVAN A. PRAKSIN (St. Petersburg). A

boy, æt. 15, received a violent blow on his head with a heavy iron rod. When brought to the Mariinsky Hospital shortly afterwards, he was quite conscious. In the left temporal region of the frontal bone there was found a scalp wound, $4\frac{1}{2}$ cm. long, leading down to a fissure in the skull, from which lumps of a bruised brain-substance were seen escaping. A half an hour later, the boy was brought under chloroform, and the scalp wound enlarged. A gaping fracture, about 4 millimetres broad, presented itself, through which a lacerated wound of the dura mater, measuring $1\frac{1}{2}$ inches in length, could be seen. Having widened the gap in the bone with a chisel, Dr. Praksin removed several depressed fragments, as well as blood clots and brain-detritus, washed out the wound with an antiseptic solution, plugged the cavity in the brain with iodoform gauze, covered the skull-contents with six layers of the gauze, bringing the latter well under the edge of the skull-opening, and then applied an antiseptic dressing over the whole injured region of the head. The progress of the patient was quite normal. On the 14th day the boy got up. On the first change of the dressing, consisting of iodoform gauze, salicylic cotton wool and tow, on the 21st day, the cutaneous wound was found to be luxuriantly granulating, and on the second change, four weeks later, the dura mater proved to be also covered with granulations." The lesion healed completely in *four months*. No explanation is given of the slow progress of the healing process. No cerebral symptoms of any kind were observed at any stage of the case.—*Vratch*, No. 49, 1887.

VALERIUS IDELSON (Berne).

IV. Case of Traumatic Cephal-Hydrocele. Spontaneous Cure. By F. A. SOUTHAM (Manchester). Male child, æt. 6 months, fell down stairs. Fracture running obliquely across parietal and occipital region on the right side. Fourteen days afterwards a swelling was noticed over seat of fracture, oval, soft, fluctuating and pulsating.

Moderate pressure was applied with a pad of lint and a bandage.

In a month the swelling entirely disappeared and the child seemed all right, though there was still a marked depression in the bone along the line of the fracture. An illustration is given and references to

Clement Lucas, *Guy's Hospital Reports*, 1876, and Connor, *American Journal of the Medical Sciences*, July, 1884.—*Brit. Med. Jour.* May 12, 1888.

C. B. KEETLEY (London).

V. Cocaine in Tonsillitis. By DEHAVILAND HALL, M.D. (London). Dr. Hall quotes several cases of acute parenchymatous tonsillitis to show the value of local painting with a 20% solution of cocaine which relieves dysphagia promptly, and seems to diminish the tendency to suppurat'ion. It is not wise to use the solution in the form of a spray on account of occasional alarming syncopal attacks, but it is well to spray the throat with solution of bicarbonate of sodium (10 grains to the ounce) before applying the cocaine, as the latter appears to act more efficaciously in presence of an alkali. Cocaine is not useful in the follicular form of tonsillitis.—*Lancet*, May 19, 1888.

VI. Laryngeal Paralysis from Acute Laryngitis. By PERCY KIDD, M.D. (London). At the Clinical Society meeting on May 11, Dr. Kidd described the laryngoscopic appearance and the symptoms in a case of complete bilateral paralysis of the vocal cords due to acute laryngitis and passing away when the latter was cured in three weeks time. There was considerable dyspnea. Dr. Kidd attributed the paralysis of the laryngeal muscles to inflammatory infiltration of the intra-muscular filaments of the recurrent laryngeal nerve, and compared the affection to the ordinary palsy of the facial nerve from cold.—*Lancet*, May 19, 1888.

A. F. STREE1 (Westgate).

VII. The Conditions following Tracheotomy for Diphtheria and Croup in Children. By DR. ROBERT JENNY (St. Gallen). This paper contains a consideration of 214 tracheotomies performed in the Canton Hospital Munsterlingen from 1873 to 1886. The ages of the children ranged from one year or under to the 17th (1) and 21st (1) year of life. It appears that all under the age of one year died (3). The percentage of recoveries is 44%. In 88% of the cases the disease was diphtheria, the membrane, in most instances,

being present on the tonsils 74%. In 17 cases where the larynx was affected by the disease 53% recovered. As a rule most of the cases entered the hospital in a condition of extreme dyspnœa. Author advocates the early operation as soon as possible after the first distinct attack of dyspnœa. The results of operation are not so good where the patient has been the subject of several attacks of threatened asphyxia. All the cases operated upon in "agone" died (3). In 22 cases the patients were brought fully asphyxiated to the operating table: in some the respiration ceased during operation. 18% of these cases recovered, Sylvester's method of restoration resorted to. The Luer silver cannula was used in most cases. In 119 cases the tracheotomy was a superior one. Of the cases where the inferior tracheotomy was performed (95) 45% recovered.

The prognosis remains more favorable in those cases in which no membrane is expelled immediately after the operation than where this occurs. The expulsion of membrane through the canula speaks for an extension of the processes of the disease, and, therefore, an unfavorable prognosis. If the temperature on the 1st day (operation) remains 39°, the respiration not above 30, the prognosis is good. If cyanosis persists for the first 24 hours after operation, and the breathing is labored in spite of efforts of the surgeon the prognosis must be unfavorable. The hæmorrhages were more common after the first 3 days succeeding operation. The chief source seemed to the author to be from spots of necrosis of the tracheal and bronchial walls left unprotected after the expulsion of pseudo-membrane. On the whole hæmorrhages were easily controlled. The décanulement was undertaken in 86 cases within the first week. In other cases the canula remained in the wound from the 8th to 11th day. The causes of death after décanulement were hæmorrhage (1), septic diphtheria (2), pneumonia (3), scarlatina (1), asphyxia (1) exhaustion (5). After tracheotomy there persisted up to date in 2% of all the cases of recovery periodic attacks of slight dyspnœa. In 9 cases (recovery) there are, at present, functional disturbances of the vocal cords. In 6 children, so far examined, (7%) the disturbances are permanent and the result of the operation.—*Zeitschr. f. Chir.* bd. xxvii, heft. 5 u 6.

HENRY KOPLIK (New York).

VIII. Electropuncture in Parenchymatous Goitre. By DR. N. WEINBAUM, (Kovel, Russia.) The author describes two cases of soft goitre permanently cured by electrolysis. I. A rather anæmic but fairly well-nourished girl, æt. 18, noticed an enlargement of her neck shortly after the commencement of her catamenia at 15. In spite of the iodine treatment, the tumor gradually increased. When she sought the author's advice in October, 1886, the circumference of her neck at the level of the eighth cervical vertebra measured 39 cm. The thyroid isthmus occupied the anterior surface from the cricoid cartilage down to a point a finger's breadth above the sternum, while the right lobe of the gland extended upwards to the hyoid bone, downwards to a line $1\frac{1}{2}$ fingers' breadth above the clavicle, and outwards to a little beyond the external edge of the sterno-cleido-mastoid muscle. The left lobe was somewhat smaller. The treatment consisted in galvanic electricity applied for from 10 to 15 minutes at a sitting and supplied by a battery of 20 cells connected with two golden needles which were thrust several millimeters deep into the tumor at two diametrically opposite spots. Only moderately strong currents were used. In all, 150 sittings were made in the course of 8 months. The tumor gradually dwindled away. When seen lately about a year after the end of the treatment, the patient was in flourishing health; not a trace of the swelling could be detected, except slight scars left by small ulcers which had been caused by the electrolytic needles. II. A small-sized anæmic, emaciated girl, æt. 15, came under observation with soft goitre of about twelve months' standing, the swelling having made its appearance shortly after her first menstruation at 14. The isthmus extended from the thyroid cartilage down to the sternum, while the lobes, enlarged almost equally, occupied the respective carotid triangles and protruded somewhat beyond the sterno-cleido-mastoid muscles. The iodine and steel treatment having failed, electrolysis was resorted to. After 50 sittings only a slight tumefaction about the right lobe remained, while the girl's general state markedly improved. Dr. Weinbaum tried the same plan also in a case of dense fibrous goitre, but failed to obtain anything beyond a trifling (1 cm.) diminution of the cervical circumference, though more than 200 sittings had been made.—*Vratch*, No. 27, 1888.

IX. *Œsophagotomia et Resectio Œsophagi Endothoracica*. By PROF. IVAN I. NASĬLOFF, (St. Petersburg, Russia.) The author proposes a new operation for removal of foreign bodies, cancers, or cicatricial strictures situated in the endothoracic portion of the gullet. The method, as devised by him upon the cadaver, consists in opening the thoracic cavity into the posterior mediastinum from behind, by the resection of four ribs, without touching the pleuræ. Having placed the patient (*i. e.*, the cadaver) on the abdomen, with the abducted and raised left upper limb, he makes (*a*) a vertical incision through the whole thickness of the soft tissues along the spine parallel to, and at a hand's breadth from the vertebral column, and (*b.* and *c.*) two horizontal incisions running from the extremities of the (*a*) towards the vertebræ. Having dissected and turned aside the quadrangular flaps thus formed, he performed a subperiosteal resection of the third, fourth, fifth and sixth ribs, of each separately. Then he carefully pushed the pleura aside with his finger, penetrated into the mediastinum, pushed forwards the lung, and thus reached the œsophagus lying on the right side of the aorta. He passes now to loosen the gullet from cellular tissue, separates the tube from the vagi by means of Langenbeck's hook, and proceeds to a circular dissection of the diseased portion, extraction of a foreign body, and so on, according to the necessities of the given case. It remains now obviously to stitch the œsophageal incision and to readjust the spinal flap. In such cases where some disease of the upper half of the gullet unexpectedly proves to be very extensive or to involve the vagi or other adjoining organs, Prof. Nasiloff thinks it justifiable to divide the gullet below the diseased part and stitch the lower half of the tube to the external wound. When the lower moiety of the œsophagus is diseased, he opens the posterior mediastinum on the right side and excises the right ribs at a somewhat lower level than that pointed out above. Technically the endothoracic œsophageal operations are said to be free from any particular difficulties as compared with other major surgical procedures—at least, as far as cadavers are concerned.—*Vratch*, No. 25, 1888.

VALERIUS IDELSON (Berne.)

CHEST AND ABDOMEN.

I. **Galactocèle ex Retentione.** By DR. K. I. ALEXANDROFF, (Kazan, Russia.) A healthy and well nourished woman, æt, 28, married 5 years, normally delivered 3 times (the last time 15 months before), was admitted to Prof. N. I. Bogoliuboff's clinic on account of a tumor in her left breast, which had been first noticed, in the shape of a nut-sized nodule, about six months before her marriage, and had been steadily increasing (first slowly, of late rapidly) ever since, without interfering with lactation. She never had any disease, or sustained any injury. On examination there was found a hard, globular, painless, non-fluctuating tumor of the size of a goose egg, deeply embedded in the middle of the somewhat enlarged mamma, the skin being movable and healthy, the nipple normal. A sarcomatous growth was diagnosed, and the whole breast amputated without delay. On the 13th day the lady was discharged well with her wound closed. The dissection showed that the tumor consisted of two cysts communicating through a slitlike opening. One of them was as large as a goose egg and was filled up with a sticky slimy fluid substance having the color and consistency of sour cream, while the other cyst was not larger than a walnut and contained a cream-like fluid. The internal surface of the fibrous wall was quite smooth, of a yellowish color. Under the microscope the surface proved to be lined with epithelial cells undergoing fatty degeneration. The wall itself consisted of fibrous connective tissue traversed with mostly obliterated and scanty blood vessels and in its outer layers with occasional milk-ducts and islets of glandular tissue. The contents consisted of milk-globules and of numberless colostrum corpuscles of various sizes. The tumor removed proved then to be a typical specimen of a true galactocèle of the bilocular variety. Since the contents of the cysts presented a different consistence, it was thought to be very likely that the large one containing a thicker mass was the older of the two. According to Dr. Alexandroff's theory, the course of events was probably this: in the patient there existed, on one hand, the secretion of milk for some time before her marriage, and on the other an obstruction of a milk duct; the milk

secreted, meeting an unsurmountable obstacle to its passage, accumulated behind it, gradually distending the acini and the adjoining part of the obstructed duct. The cyst, while steadily increasing continued to compress the milk-ducts in its neighborhood the more, until one of the latter became with time absolutely impassable, which circumstance then gave rise to the formation of the smaller cyst. The writer gives a carefully written review of the literature of galactoceles. He was able to find only two instances of the acute variety or the so-called *galactocoele ex infiltrationem*, one of which belongs to Velpeau and another to Scanzoni. Of the chronic form, or *galactocoele ex retentionem*, galactocoele proper, he adduces the cases of Scarpa, Forget, Bouchacourt, Velpeau (3 cases, one of them arising in a working man, æt. 75, in whom the galactocoele had attained the size of two male fists,) Astley Cooper, Dupuytren, Bassius and a Warsaw practitioner named Matlakowski. The last named case (published in the Polish *Gazeta Lekarska*. No. 11, 1886,) occurred in a peasant woman, aged 25, who a day or so after her first delivery experienced acute pain in her right breast, caused, as she thought, by her lying on this side. At the same time she could feel a nut-sized lump deep in the gland. The lump began gradually to increase and, in four years, about the time of her third labor, reached the size of a hen's egg, remaining quite painless up to that date. But about four months later, there suddenly appeared an excruciating pain, and induration and enlargement of the breast. On examination, Dr. Matlakowski found a hard, slightly uneven, fluctuating tumor of the size of a goose egg, painless on pressure. He extirpated it. The tumor proved to be a cyst weighing 40 grammes and containing "a very thick, semi-fluid, grayish white substance resembling an inspissated oil color." According to Dr. Wencki's analysis, the matter consisted of proteids, fats, salts and water. Under the microscope there were seen crystals of tristearine and tripalmatine acids, milk corpuscles, and some cocci and diplococci. Having considered symptoms, diagnosis and treatment of true galactocoele, Dr. Alexandroff winds up his interesting little monograph by the following propositions:

1. Galactocoele can arise not only in women, but also in men—in

those namely, in whom the development of mammary glands does not stop at a rudimentary stage but progress so as to allow a secretory action (as in the classical case of Prof. Hall, of Maryland, of a male negro, of 55, who had been an excellent wet nurse for many years.)

2. In women, galactoceles can arise both during lactation and quite independently of it (in girls,) though the former case is met more frequently than the latter.

3. The contents of milk-cysts can undergo various metamorphoses. Their pure milky fluid can transform into butter, curds and lime concretions.

4. Galactocoele is a benign tumor.

5. Hence, in uncomplicated cases, surgical treatment may be limited to extirpation of cysts alone, or to incision with subsequent cauterization of the internal surface of the sac by thermocautery or chemical substances (iodine, nitrate of silver, etc.)

6. To prevent any diagnostic errors, an exploratory puncture of the cyst must be invariably practised, since such signs of the development of a tumor during lactation, fluctuation, absence of inflammatory symptoms, etc., are but unreliable criteria for a differential diagnosis. —*Khürürgitchesky Vestnik*, (St. Petersburg, Russia,) February, 1888.

VALERIUS IDEL ON (Berne.)

II. A Case of Pleuro-Pneumonia Followed by Gangrene of Lungs and Abscess; Resection of Rib; Drainage of Lung Abscess; Recovery. By Dr. BLUNT (Leicester).—This was a successful case, which, except for the active treatment adopted, would probably have had a very different result. The patient, a male, æt. 29, was admitted with all the signs of acute pleuro-pneumonia. Three days after admission the right side was aspirated, and eight ounces of clear serum extracted, but without much relief to the symptoms. About 14 days after this, the cough having increased in severity, he expectorated thirteen ounces of most offensive and purulent sputum. Then the temperature fell, and the patient began to improve, and was allowed for a short time to leave his bed. But in

about a month's time the symptoms recommenced; he commenced to lose flesh, suffered from night perspirations, with raised temperature. The sputum was stained for tubercle bacilli, but none were found. As the patient did not improve, and an abscess in the lung was suspected, the following operative procedures were carried out on the 122nd day of his illness: Chloroform having been administered an aspirating needle was inserted about one inch below the angle of the right scapula, and nothing being withdrawn from the pleura, it was thrust through the lung tissue until a large cavity was struck, from which some very offensive pus was withdrawn; the needle was left as a guide: an incision was made down on to the rib, and one inch and a half of the latter resected; the lung tissue was cut through until the abscess was freely opened; into this a drainage tube was introduced; dressings of wood-wool were applied. The patient bore the operation well. The dressings were changed as often as the discharge soaked through them. From the date of operation the patient progressed most favorably, the temperature never reaching above normal, and the expectation ceasing in a few days. Forty-nine days after the operation the patient was discharged as well, and sent to a convalescent home at the seaside, where in the course of a month he gained a stone in weight.—*Lancet*, March 31, 1888.

H. PERCY DUNN., (London).

III. Cases of Gall-Stones Exciting Suppuration: Operation: Recovery. By A. PEARCE GOULD, F.R.C.S. (London), and C. B. KEETLEY, F.R.C.S. (London.)—Gould's case was that of a gentleman, æt. 38, who had had symptoms of gall stones for two years. The abscess was in the abdominal wall at the junction of the epigastrium and right hypochondrium. 140 small biliary calculi were removed, together with pus. No bile was discharged through at any time, but the sinus was long in healing. Mr. Gould had found reference to thirty-five other cases of gall stones making their way through the abdominal wall, but this was the only one in which the diagnosis appeared to have been made prior to the abscess bursting.

In a case of my own in which over a hundred gall-stones were re-

moved from an abscess in the right hypochondriac and lumbar regions, the incision was made as nearly as possible in a convenient place for following the track of suppuration up to the gall bladder, and not over the centre of the abscess. A probable diagnosis was easy to make and proved to be right. Before me is the house-surgeon's notice paper, sent out the day before operation, in which he describes what is to be done as "for suppuration of the gall bladder." My patient was a middle aged woman, operated on at the West London Hospital, Jan 18, 1887, and exhibited at the West London Medico-Chirurgical Society soon afterward. As a matter of fact some surgeons in reporting such cases do not think it necessary to write what they thought before the operation, as there is no room for difference of opinion afterward. In my case the gall bladder itself was explored, and bile escaped for some weeks afterward. The patient was seen recently in good health. Mr Gould's case was read before the Clinical Society of London on March 23, 1888.

C. B. KEETLEY (London)

IV. Notes on two Cases of Laparotomy for Penetrating Gunshot Wound of the Abdomen; Recovery of One. With remarks on Recent Statistics. By ARTHUR J. BARKER, F.R.C.S. (London.)—Mr. Barker gives a table of 26 cases of abdominal section, performed on account of gunshot wound, and reported since MacCormac published his 32 cases. Of the 26, no less than 6 are quoted by Mr. Barker from the *ANNALS OF SURGERY*. [November, 1887, and July, 1887, papers by C. T. Parkes and J. I. Skelly, respectively. Cases also by McGraw and Murphy.]

The following are abstracts of Mr. Barker's own two cases :

Case I. A. T., æt. 23, a French jeweller, admitted into hospital 3:20 A. M., having shot himself in the abdomen half an hour previously. Moderate shock, conscious, but dazed and groaning. Pulse 56, markedly dicrotous (probably normally so) of good volume. Temperature in rectum 98.2°; no vomiting; lay on right side with knees drawn up. Breathing slow and shallow, with an occasional catch. Small bullet wound with blackened edges over border of right costal cartilages, one inch from middle line at level of tip of ensiform cartilage.

Pistol, "a small pin-fire weapon, carrying a conical ball, 11 millimètres long, 7 millimètres in diameter, and weighing 60 grains." No external bleeding. A suspicion of dulness in right flank. Much abdominal tenderness.

Operation at 6:30 P. M. Incision at first two and one-half inches long over tip of ensiform cartilage, afterward extended down to umbilicus. Nearly under aperture made by bullet in parietal peritoneum was found a patch of ecchymosis under serous covering of liver, which suggested the point at which that viscus had been struck by the bullet. No wound of liver. Clots beneath abdominal walls and lying upon colon and omentum. Stomach examined carefully showed no injury. 18 inches of transverse colon were drawn out and examined. Omentum along its lower border much blood-stained and covered with clots. These clots were carefully disentangled from the omentum to discover any lesions of its own vessels. While the omentum was being wiped clean, the bullet was found in its folds, and, a moment later, a small round wad. From the position of the bullet it appeared quite clear that it had struck the liver at the insertion of the falciform ligament, and had glanced off it and passed between the abdominal wall and the stomach and transverse colon, as nearly as possible in the middle line, to become entangled in the folds of the omentum, some of whose vessels were torn. It seemed highly improbable, therefore, that any other viscera were injured. Nevertheless, all the coils of intestine were exposed and carefully examined, and sponges passed into the pelvis, etc., to see if any fluid had gravitated there. After thorough cleansing by sponging, all parts were replaced in their normal position and the wound closed. The bullet track in the abdominal wall was scoured well, rubbed with iodoform and a drainage tube passed into it up to but not through the peritoneum. No vomiting after anæsthetic. Very little pain. Temperature same night, 103.6°, Pulse 100. 24 hours afterward both were normal and remained so. Union by first intention. Patient left hospital quite well on 21st day.

Case 2. Mr. F. G., æt. 37, an American, admitted night following preceding case, 8:30 P. M., shot in abdomen half an hour previously with a Colt's revolver, carrying a conical bullet, 15 millimètres

long, 9 millimètres in diameter, and weighing 143 grains. At 9 P. M. quite comfortable, with no trace of shock, and not suffering in any way. The shot had been fired at close quarters and the ball had struck the abdominal wall $3\frac{1}{4}$ inches internal to the right anterior superior iliac spine, and half an inch below it. No bleeding at this time, but clothes much blood stained.

It was believed that the ball had emerged without entering the abdominal cavity. The patient was told so, and then put under an anæsthetic for the purpose of a thorough exploration. The result was to show that the peritoneum had been perforated, and the patient was allowed to come to, in order that his consent might be obtained to further operative measures. Then, owing to some delay on the part of the police authorities in taking the patient's depositions [the case was an aggravated one of manslaughter, if not murder], the operation was not begun till 1:5 A. M., 5 hours after the injury, which took place within five minutes slow cab drive of the hospital, in the centre of the metropolis and early in the evening! Clearly, the police and magistrates of London had not then learned that gunshot wounds are urgent cases which require prompt treatment.

Operation.—A four inch incision in direction of fibres of external oblique, and having bullet wound in centre. Blood mixed with clots, but with no fæcal odor escaped to the extent of three or four ounces. Peritoneal aperture of exit was found not more than half an inch from aperture of entrance. Cæcum lay near but unwounded. But when the adjacent coils of small intestine were drawn out, two wounds were found in one coil which exactly corresponded to those in the peritoneum. "These wounds were round with slightly bruised edges, from which the mucous membrane did not protrude. They bled freely but no fæces escaped from them, the bowel appearing to be quite collapsed on either side. Fearing," writes Mr. Barker, "that to simply suture these two wounds would seriously narrow the lumen of the bowel, I at once excised a wedge-shaped portion of the gut, including the injured part." The bowel having been emptied by pressure was held on either side by the fingers of an assistant, and a complete ring of the intestine half an inch broad at its injured aspect removed by

scissors, the mesentery being slightly notched. The edges of the muscular and serous coats of the bowel were united by a continuous suture.

In addition a row of interrupted suture (Lembert's) was used. Other intestinal coils were examined and found intact. Final cleansing with sublimate solution (1-1000), sponging out, etc. A drainage tube in track of ball right into the abdomen. Operation lasted 1 hour 29 minutes; no shock. Salicylic wool dressing.

Nevertheless the patient did not do well. For four or five days his temperature rose usually to 101° to 102° , his pulse was rapid, he vomited occasionally and took little or no nourishment. He had peptonized enemata. The abdomen was tense. On the morning of the sixth day he died.

Post Mortem. The small intestines were found very much distended, although the bowel was not obstructed in any way at the site of the enterectomy. There was a moderate amount of peritonitis, but much hypostatic pneumonia in both lungs. The spleen was normal.

One can sympathize with the author who writes that he "turned away from this necropsy with an intensified feeling of disappointment because the patient had so nearly recovered.

Case 1 was the first successful case of laparotomy for gunshot wound recorded in the British Islands.

In case 2, Mr. Barker thinks what little peritonitis there was started from some spot in the peritoneum not thoroughly cleansed from matter escaped from the wounded bowel, and he thinks also that a more perfect antisepsis could have been carried out by median incision and irrigation.

Whereas out of the 32 laparotomies for gunshot injury of the abdomen included in the list published last year by Sir Wm. MacCormac, only seven recovered, the 26 fresh cases collected by Mr. Barker and tabulated in the paper we are noticing, counted 16 recoveries and 10 deaths. The two tables together, of course, give 58 cases with 23 recoveries and 35 deaths.—*British Medical Journal*, March 17, 1888.

C. B. KEETLEY (London)

V. Laparotomy for Congenital Umbilical Hernia in a New Born Infant. By DR. V. STOLYPINSKY (Kazan, Russia). A peasant woman was delivered normally at full term of a healthy and full-sized girl in whom there was at once noticed a tense umbilical hernia of the size of a goose's egg ($=18 \times 16$ cm). Having ligatured and divided the umbilical cord about four finger's breadths above the swelling, two or three minutes after labor Prof. Fenomenoff tried to reduce the rupture by means of taxis, but in vain, the umbilical ring being extremely narrow and tight. Since the latter circumstance practically excluded any possibility of a spontaneous reduction, while, on the other hand the hernia proved to be covered only with a very thin, transparent membrane (amnion and peritoneum), through which intestinal loops were visible, it was deemed highly probable that the rupture, if left alone, would at a more or less early date, undergo a sloughing process, and thus cause the infant's death. Moved by those considerations, Prof. Fenomenoff decided to perform a radical operation without loss of time. Accordingly, the girl, *when ten minutes old*, was brought under the influence of chloroform (by a couple of whiffs) and washed with soap and borax, after which an incision 3 cm., long, was made upward from the umbilical ring and somewhat to the left of the linea alba. The peritoneum having been opened, all the knuckles protruding could easily be returned into the abdomen except one loop which was intensely inflated and also firmly adherent to the hernial sac, and which proved irreducible even after an enlargement of the abdominal wound. The reduction could be effected only after dissecting away piece of the sac, which was left then in connection with the adherent loop. The whole hernial sac having been excised close to the umbilical ring, the abdominal wound and the ring were closed with four deep and three superficial silk sutures, while the peritoneal layer, in addition, was stitched together with interrupted catgut sutures. The wound was then dressed with a simple pure gauze compress, adhesive plaster, and gauze roller. The infant bore the operation very well; in fact, except vomiting of a greenish fluid occurring twice during the night and once on the next day, there was nothing abnormal whatever at any time. She was put to the mother's breast on the next morning, stools

came daily once or twice. On the eighth day all sutures were removed. The wound was found closed *per primam* on the 16th day. Having gained in weight 575 grammes, the patient was discharged in excellent state on the 17th day after the major operation with which she had commenced her extrauterine life.—*Dnevnik Kazanskahs Obshtchestva Vrachëi* (—"Diary of the Kazan Medical Society," May 24, 1888.

VALERIUS IDELSON (Berne).

VI. On Washing out the Peritoneum after Laparotomy.
By DR. TERRILLON (Paris). The author begins his paper by referring to the observations, made on man and animals, which prove that blood and other fluids when aseptic may be absorbed by the peritoneum. At the same time, however, he shows that in abdominal operations it is never wise to trust to this power of absorption, and alludes to the recognized practice of carefully cleansing the peritoneal cavity at the end of every abdominal operation. In ordinary cases this can be efficiently done either by soft and carefully cleansed sponges, or by dry cloths, the disadvantage of which, however, is that they are apt to leave flakes behind them. In ruptured cysts, however, or when there are "cysts with adhesions, salpingitis, hysterectomies, etc." the thorough cleansing can only be carried out by washing out the peritoneal cavity, with boiled or filtered, or, if possible, distilled water. Usually the temperature of the water is 30°C., but sometimes it is higher, to check hæmorrhage, not otherwise easily stopped, or to antagonize a condition of shock (Wylie). In no case does the author recommend the use of antiseptic fluids for washing out, because if strong enough as antiseptics they are too irritating, and if weak enough to be non-irritating they are of little value as antiseptics. Removal of all foreign material by a plentiful use of aseptic water is all that he considers necessary. The water is to be introduced through a tube from a syphon or douche (Higginson's syringe?) and the current is to be directed to all parts of the abdominal cavity so as to carry out clots and contents of cysts, etc. The stream is to be continued until it returns clear. Occasionally, previously unrecognized points of hæmorrhage may be revealed by the presence of a tinge of blood. As much as possible of the superfluous fluid is to be carefully sponged away at the end of the proceeding.

The author believes that his results after severe abdominal operations have been much improved since he adopted this plan in 1886. He refers to its use by Keith, Lawson Tait and others.—*Le Bulletin Médical*, Oct. 12, 1887.

CHARLES W. CATHCART (Edinburgh).

BONES, JOINTS, ORTHOPÆDIC.

I, Spontaneous Fracture in a Sarcomatous Tibia Followed by Bony Union. By M. VALAT (Paris). In this case the sarcoma appears to have been a slowly growing one of central origin, and the first fracture occurred some months before any tumor was noticed, the patient got about with crutches until a year later when a second fracture occurred. This slow evolution raised the suspicion of hydatid disease, but an exploratory puncture set the question at rest. After death it was found that both fractures had united by good osseous union, a very rare occurrence in the case of sarcomata of bone, and one which tends to prove that the usual failure to unite simply depends on the rapid progress of the tumor.—*Bulletin de la Soc. Anatomique*, Feb, 17, 1888.

J. HUTCHINSON, JR. (London).

II Acute Suppuration after Correction of Ankylosis by Manual Force. By DR. E. MILLER (Tuebingen). The author describes a case of ankylosis of the hip joint after acute osteo-myelitis, in which mobilization was attempted by manual force, but where suppuration of the joint followed the attempt. Oberst has published four similar cases from Volkmann's clinic, where acute suppuration was set up in ankylosed joints resulting from acute infectious diseases. It is probable that in all these cases germs, which had not lost their vitality, remained imbedded in the tissues and were again set free by the method adopted. It is, moreover, remarkable that such operative measures in ankylosis after tubercular disease or perforating shot-wounds are not followed by suppuration.—*Beitrage zur Klinische Chir. Mittheilungen aus der chirurg. klinik zu Tuebingen*. Bd. i, heft. 2

FRED KAMMERER (New York).

III. The Operative Treatment of Paralytic Joints (Arthrodesis). By DR. OTTO ZINSMEISTER (Vienna). The author records those cases of paralytic joints operated upon during the past five years in Prof. Albert's clinic. Artificial ankylosis was produced in ten patients. In these fourteen arthrodeses were produced (knee 5, foot 9. Polyomyelitis anterior acuta was causal agent in eight cases, and in two cases the paralysis followed typhus and variola). All operated cases were followed by favorable results. If the cases recorded in literature are collated (ankle 7, shoulder 2) it is found that the lower extremity was most frequently the object of operative interference. Infantile paralysis was most frequently the agent causing the paralysis. The indication to operation consists in the failure of other procedures after reasonable time (1 year) to produce a useful joint. The muscles need not be intact necessarily. Only one muscle (ileopsoas) is absolutely essential to the movement of the lower extremity. In the hip joint the quadratus lumborum must be intact. In the Albert clinic arthrodeses forms a part of the operation for marked pes varus paralyticus. In very young individuals the arthrodesis is contraindicated. All operations are performed with Esmarch bandage. —*Zeitsch f. Chir. bd.*, xxvi heft 5. u 6.

HENRY KOPLIK (New York).

THE HISTORY OF THE FILARIA SANGUINIS
HOMINIS, ITS DISCOVERY IN THE UNITED
STATES, AND ESPECIALLY THE RELATIONSHIP OF THE PARASITE TO
CHYLOCELE OF THE TUNICA VAGINALIS TESTIS.¹

By WILLIAM M. MASTIN, M.D.,

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IN this epoch of parasitical medicine, when the microscope stands as the arbiter of all disease, and the simplest pathological changes are ascribed, oftentimes upon the slenderest hypothesis, to the presence of some specific germ of either zoöid or phytoid life, it is of refreshing interest to turn to a form of parasite of which we possess a degree of exact knowledge, and that has been demonstrated to hold an intimate association in the relation of cause and effect to a diversity of morbid conditions. Furthermore, it now becomes a subject of increasing importance, since the boundary of its geographical existence² has been widened by its recent dis-

¹Read at the meeting of the American Association of Genito-Urinary Surgeons, Congress of American Physicians and Surgeons, Washington, D.C., September, 18th, 19th, and 20th, 1888.

²The positive dependence of one form of chyluria upon the presence of the filaria sanguinis hominis is so well established, that it may be said of the nematode as has been remarked of that disease, it is found usually in persons who, at sometime have resided in countries situated between the degrees of about 30° N. and 30° S. latitude. The worm has been discovered in, and is believed to be native to, the following countries and localities: Brazil—Bahia; India—Calcutta and Madras; Australia—Brisbane, Queensland; Egypt—Cairo; East Coast of Africa—Natal, also South Coast of Africa; China—city and district of Amoy, Foochow, and other portions; West Indies—Cuba and Guadaloupe; and since 1886, in the southern portion of the United States—Charleston, South Carolina, and Mobile, Alabama.

Dr. Myers, of Formosa, thinks from his researches that the surroundings of this island are not favorable to the reproduction of the filaria. This, however, is very questionable, since his data are too meagre to admit of a definite conclusion. (Vide Bibliography).

covery in the United States—a territory until then regarded as not furnishing the surroundings essential to its indigenous life.

The conjecture, or rather belief, that the blood of man does occasionally become infested with animal organisms, particularly in the form of minute worms, is by no means a new or modern idea. On the contrary, this opinion, in addition to being deeply rooted in the popular mind, has received the recognition of medical writers for centuries; but the examples brought forward from time to time in support of the theory have failed to supply the convincing testimony that the blood was their natural habitat. These instances, as far as ascertained, have belonged principally to the class of *Distoma*, especially the *distomum hæmatobium* (*Bilharzia*), which have been found occupying the *vena portæ* and other large vessels in direct or near proximity to the intestinal tract.

Again, other varieties of entozoa have been discovered in the vascular system, among which were probably young specimens of *echinococci*.¹ All of these, however, besides having been detected in several tissues of the body, possess a dimension beyond the capacity of the smaller blood-vessel ramifications; and, consequently, thus confined to vessels of comparatively large calibre, they could not gain access to the general circulation, and, therefore, can scarcely be viewed in the light of pure blood parasites.

Such was the existing status of our knowledge when, in 1872, the positive demonstration of a true *hæmatozoon*² fell to the fortune of Dr. Timothy Richards Lewis, of Calcutta, who discovered in a drop of blood, from the finger of a native youth, an embryo nematode to which he applied the descrip-

¹Klencke, in 1843, discovered entozoa in the blood of an individual suffering from vertigo, but his description is too vague to admit of a positive assertion as to their exact character, although it is believed that they were most probably young specimens of *echinococci*.

²The designation of this nematode as a *true hæmatozoon* might be objected to very properly on the ground of Manson's recent discoveries; especially, that a lymphatic duct is the habitat of the adult worm (*Filaria Bancrofti*); that the embryos are often present in the lymph and lymphous discharge when absent from the blood; and that disorders of the lymphatic system are most frequently associated with the presence of the parasite.

tive title of *filaria sanguinis hominis*, and by which it is now most commonly known.

Renewed impetus was thus given to hæmic research—the vital fluid of man and animal alike was subjected to the scrutinizing vision of the microscope,—and, as in all brilliant and important discoveries, controverting theories and claims of priority were not tardy in arising and receiving vigorous support. These, together with the additional developments which rapidly followed, have thrown around the subject quite a confusing uncertainty; and hence there is found pervading its literature not only the contending claims of different observers, and statements misleading as to its identity with filarial discoveries in other localities and regions, but also the confounding of the embryonal with the mature form of the helminth.

It will scarcely be amiss, therefore, to review briefly the general history of the subject, and this will be facilitated by examining that of the embryo and parental worm separately, and arranging each important event in the chronological order of occurrence.

It is generally conceded, I believe, that to Dr. Otto Wucherer¹, of Bahia, Brazil, belongs the honor of being the first to discover the embryo-filaria. This occurred August 4, 1866², at which date, whilst searching for the *Bilharzia hæmatobia*, he found in the chylous urine of a female patient in the Misericordia Hospital, at Bahia, several of these, then unknown, living embryos in active motion; and again, he detected them a second time in the like fluid of another female suffering from hæmaturia, on October 9, of the same year. These specimens were sent to Leuckhart for identification, who

¹Gazeta Medica da Bahia, Dec., 1868, p. 99.

²T. R. Lewis gives this date of discovery as 1868, (Quain's Dictionary of Medicine, Art. Chyluria, p. 250). Sir Joseph Fayrer speaks of it in one place as occurring in 1866, and on another page mentions the date as "1866 or 1868". (On the relation of *Filaria Sanguinis Hominis* to the Endemic Diseases of India. Read at the Epidemiological Society, Feb. 5, 1879, London Lancet, vol. 1, Feb. 8, 1879, p. 188 *et seq*.) I have placed it with Cobbold (Parasites: A treatise on the Entozoa of Man and Animals, including some account of Ectozoa, London, 1879, p. 181) in the year 1866, as recorded in the text, and which is the correct date, as shown by Wucherer's original publication referred to above.

suggested that they were the embryos of some round worm, belonging, most probably, to the Strongylidæ. Wucherer modestly declined, however, to assign to them an etiological significance, or even to offer a conjecture as to their coexistence with hæmato-chyluria, declaring that he preferred to wait until further investigation could be made, or, at least, the necropsic examination of a hæmaturic was possible.

Very naturally the parasite is sometimes spoken of as Wucherer's *Filaria*.¹

Dr. J. H. Salisbury, in the United States, reported,² in the year 1868, the finding of a minute entozoon in the human bladder, which he described as a new species of nematode; and, although unacquainted with the mature form of the worm, classed it in the genus *Trichina*,—designating it *Trichina Cystica*.

He stated that he had met with it in the urine in three instances. In two of these its presence was not constant, being found only occasionally, whereas in the third case it occurred in great numbers,—not infrequently a single drop of urine containing no less than from ten to fifteen ova. This last case was a female, sixty-five years of age, with partial paralysis, who had been insane for several years, and was then suffering from "cystenic rheumatism" or "cystinemia," and voiding a milky urine, dense and scanty, filled with granular cystine, but without blood admixture. The history of this case is extremely meagre, and, furthermore, no reference whatever is made to the physical condition of the other two patients, which greatly lessens the value of the discovery.

In a report published in 1870 by the British Government,³

¹Also termed Wucherer's Embryonic *Filaria*.

²Art. VI. On the Parasitic Forms Developed in Parent Epithelial Cells of the Urinary and Genital Organs, and in their Secretions. (With thirty-four illustrations.) Amer. Jour. Med. Sci., No. cx., April, 1868, pp. 376-77

Dr. Salisbury's paper contains two wood-cuts of the ova (Figs. 29 and 30), and one of the escaped embryos (Fig. 31), all of which are fair illustrations of the parasite as we now know it.

³British Medical Journal, Nov. 19, 1870 (abstract.) Also: On a Hæmatozoon Inhabiting Human Blood: Its Relations to Chyluria and other Diseases, by T. R. Lewis, Eighth Ann. Rep't. Sanitary Comm. with Govm't of India, 1871, Appendix E. Calcutta, 1872. Also: Quain's Dic. Med., Art., Chyluria, p. 250. Also: A Prac. Treatise on Urinary and Renal Diseases, etc., by William Roberts, M.D. London, 1876, p. 597.

Dr. T. R. Lewis, being then ignorant of previous observations of a similar character, stated that in March, 1870,¹ he had found in milky urine, voided by a man under the professional care of Dr. R. T. Lyons in Calcutta, numerous living microscopic nematoid worms. Specimens of these, forwarded to Dr. Parkes, were seen and examined by Prof. Busk, who considered them as belonging to the Filaridæ.

This was the earliest discovery in India, and was verified in the course of the next few months (end of 1870 or beginning of 1871) by Dr. W. J. Palmer and Dr. Charles,—these observers detecting the same entozoa in chylous urine of other patients in Calcutta.

On, and shortly prior to, July 25th, 1870, T. Spencer Cobbold,² of London, observed the larvæ of a minute nematode in the urinary deposit of a case of "Bilharzia," from Natal. These were obtained on several occasions, were well-developed, in a state of activity, and in goodly numbers, as many as fifty being counted at one examination. He regarded them as identical with the embryos described by Salisbury; but realizing that these organisms represented parasites in their primary embryo stages, and appreciating how frequently errors of interpretation had already gained access to helminthological literature, he was particularly cautious in giving expression to any direct or positive views in relation to them. Consequently, he avoided the adoption of a special name, and, indeed, refused to speculate either as to their origin or pathological importance.

Almost coincident with this date, July 27th, 1870, Dr. Jules Crévaux,³ a French Naval Surgeon, supplied additional confirmation of these observations by finding like entozoa in the

¹Sir Joseph Fayrer (On the Relation of *Filaria Sanguinis Hominis* to the Endemic Diseases of India, loc. cit.) erroneously gives this date as 1869.

²Appendix to a paper on "Bilharzia," communicated to the Metropolitan Counties Branch of the British Medical Association, May 17, 1872. (vide Cobbold's work on Parasites: A treatise on the Entozoa of Man and Animals, etc., London, 1879, pp. 182-3.

³De l'hématurie Chyleuse, etc., 1872. Also: L'Union Médicale, 1872. Also: Jour. de l'Anat. et de la Physiol. T. xi. 1875. Also: Quain's Dict. Med. Art. Chyluria, p. 250. Also: Cobbold, Op. Cit. p. 184. Also: Leuckhart's "Parasiten," bd. 11, p. 628, *et seq.*

urine of a young creole affected with "hematurie chyleuse," at Gaudaloupe. He searched the blood¹ of the same patient for parasites on several occasions, but with negative results. These examinations were made in conjunction with Dr. A. Corre,² who also published a careful description of the worms.

Undoubtedly the most important event among the various historic and scientific developments associated with the filaria was the discovery of its presence in human blood, in July, 1872.³ As already mentioned, this was made by Dr. T. R. Lewis whilst examining the blood from the finger of a Hindoo patient, suffering from diarrhœa, in the Calcutta Medical College Hospital, when he found nine of these nematoid entozoa in a single slide. Later he detected them again in the blood of a chyluric; and since the original discovery he has traced them directly to the blood of about fifteen individuals, and to the several tissues and secretions of thirty-five others,⁴—all of whom, except the first, were, or had been, the subject of chyluria, or some morbid condition bearing thereto intimate pathological relations.

From Egypt comes the next advance in the measured march of discovery. This step was independently taken by Dr. Prospero Sonsino, of Cairo, in his "find" on February 1, 1874, and which he made known a few months later in a communication⁵ addressed to the Neapolitan Royal Academy. In

¹It should be mentioned in this connection that Dr. J. da Silva Lima, of Brazil, made blood examinations for hæmatozoa, but these also were in vain (vide Cobbold, Op. Cit. p. 184.)

²Note Sur l'helminthe rencontre dans les urines hémato-chyleuses, Rev. des Sci. Nat. 1872. Also: Cobbold, Op. Cit., p. 184.

³T. R. Lewis, On a Hæmatozoon in Human Blood: Its connection with Chyluria and other Diseases. Eighth Ann. Rep't. of the Sanitary Comm., with the Govm't of India, Calcutta, 1872. Also: Quain's Dic of Med, 1883, Art. Chyluria, p. 250. Also: On the the Pathological Significance of Nematode Hæmatozoa. Tenth Rep. of Sanitary Comm. with the Govm't of India, 1874. Also: Sir Joseph Fayrer, On the Relation of Filaria Sanguinis Hominis to the Endemic Diseases of India, London Lancet, Vol. I., Feby. 8, 1879, p. 188. Also: Cobbold, Parasites: A Treatise on the Entozoa of Man and Animals, etc., 1879, p. 184.

⁴These statistics were given by Lewis in 1882. (vide Quain's Dic. Med. loc. cit.)

⁵Ricerche intorno alla Bilharzia hæmatobia in relazione colla Ematuria Endemica dell'Egitto e nota intorno un nematoideo trovato nel sangue umano. Estr. dal Rend. del R. Accad; April 20, 1874. Also: Cobbold, op. cit. p. 185. Also: Sir Joseph Fayrer, On Filaria Sanguinis Hominis Aegyptiaca, London Lancet, vol. 1, Aug. 26, 1876.

this memoir he remarks that the host was an Egyptian Jew boy, residing in Cairo, fifteen years of age, the subject of hæmaturia. A drop of blood from this lad's finger placed under the microscope disclosed to his astonished vision "a living organism of the form of a nematode, resembling *Anguillula*, in the midst of the hæmatic corpuscles."¹ The nematode was found also in the urine,² which, in addition, contained distoma.

Not finding in these specimens the delicate enveloping sac or chorional tunic, which Lewis described as characteristic of the embryo, he believed that he had been made acquainted with a form of filaria differing from the Indian variety, and, therefore, suggested as an addition to its original name the distinguishing suffix of *Ægyptiaca*, thus entitling the hæmatozoon, *filaria sanguinis hominis Ægyptiaca*.

Ascertaining at a later period, however, that the external envelope was not constant, but, on the contrary, only the embryo skin separating by ecdysis—a desquamation or moulting, as it were, of the embryo—and which further personal observations enabled him to verify, he declared³ that then the reason no longer existed for looking upon the Egyptian worm as belonging to a different species from the one discovered in India by Dr. Lewis, and consequently discarded the supplemental term.

The geographical distribution of the hæmatozoon was still further enlarged by O'Neill⁴ in 1875, on the south coast of Africa, who found embryo-nematodes in the exudate from the skin in a disease known to the negroes as *craw-craw*; and by Silva Araujo,⁵ at Bahia, who also saw them in the cutaneous

¹Op. cit. pp. 11 and 12.

²He found it again shortly afterwards in the urine of another hæmaturic.

³*Filaria Sanguinis Hominis*, Lymphocele, Lymphuria, and Other Associated Morbid Disorders; With a hint of Other Worm Diseases in Egypt. Med. Times and Gazette, March 13, 1882.

⁴On *Craw-Craw*. Lancet, London, Feb'y, 1875. Also: Sir Joseph Fayrer, On the Relation of *Filaria Sanguinis Hominis* to the Endemic Diseases of India. London Lancet, Feb'y 8, 1879.

⁵A. J. P. da Silva Araujo, Memoria sobre a filariose, ou a molestia produzida por uma nova especie de parasita cutaneo. Bahia, 1875. Also: Archiv. Med. Nav. 1875 and 1878. Also: Sir Joseph Fayrer, on the Relation of *Filaria Sanguinis Hominis* to the Endemic Diseases of India. Loc. cit.

exudate from a negro, the victim of the same affection (crawl-crawl), and which he called *filaria dermethemica*.

Again, the filaria was detected, in 1876,¹ by Dr. J. Bancroft,² of Brisbane, Queensland, Australia, in the blood of a little girl, ten years old, the subject of chyluria. Blood from this patient was sent to Dr. William Roberts, of Manchester, who, together with Dr. Cobbold, examined it, and were thus able to verify the presence of the filaria embryos.

These were accompanied or soon followed by the observations of Patrick Manson,³ in China, Silva Lima and Dos Santos, in Brazil, Finlay⁴ in Cuba, and numerous other workers in tropical and sub-tropical countries.

Among the embryos in the filariated blood sent to England from Australia by Dr. Bancroft (*vide supra*) was found a solitary and empty egg-shell. This fact was almost direct proof of the belief already entertained that the filaria was the larval stage of some larger nematoid worm, and, therefore, Dr. Cobbold hastened to inform Bancroft of its presence, thereby inducing the latter observer to persevere in his researches in this department of helminthology.

These investigations, although attended by much laborious work, were so successfully conducted that, in a letter to Dr. Cobbold, dated April 20, 1877, he conveyed the intelligence of the discovery of the parent parasite, which was a dead female⁵ obtained, on Dec. 21, 1876,⁶ from a lymphatic abscess of the arm. Again, on another occasion shortly thereafter, he procured four additional specimens, all females and alive, from a

¹Chyluria is common in Brisbane, and this case of Bancroft's was not the only one in which he had already discovered filariæ in the blood; and hence it is very evident that his original discovery was prior to 1876—probably the previous year, although I do not know the date.

²Cobbold, *op. cit.*, p. 186.

³Cobbold, *op. cit.*

⁴Charles Finlay, Consideraciones a cerca de algunos casos de filariosis observados en la Habana. An. re Acad. de Cien. Méd. de la Habana, 1882-3, xix, 40-51.

⁵The mature female is a long, thread-like worm, from $3\frac{1}{2}$ to 4 inches in length, and 1-90 inch in breadth. The male is more plump and somewhat smaller.

⁶Cobbold, *op. cit.* p. 187. Also: Sir Joseph Fayrer, on the Relation of *Filaria Sanguinis Hominis* to the Endemic Diseases of India. Lond. Lancet, vol. 1, Feb'y 8, 1879, 188. Also: Quain's Dic. Med. Art. *Filaria Sanguinis Hominis*, p. 512-13.

hydrocele of the spermatic cord, having caught them, entwined together, in the eye of a "peculiar trocar" used by him for tapping; and a few months later he forwarded all five¹ of these to Dr. Cobbold for examination.

In the following July Dr. Cobbold announced² this discovery of Bancroft's, giving to the mature worm the binomial term of *filaria Bancrofti*; and, in October of the same year, after an attentive examination and study of the specimens sent from Brisbane, he published³ a second account of the discovery with a minute and carefully prepared description of the adult form.

In the same year, 1876, and possibly antedating the discovery by Bancroft, the parent filaria was found by Carter in India, in "a lymphatic abscess and hydrocele of the spermatic cord."⁴

Two living specimens of the mature helminth, male and female, were found by Dr. Lewis on August 7, 1877.⁵ These were harbored by a young Bengalee lad suffering from well-marked nævoid elephantiasis of the scrotum,⁶ associated with embryo-filariæ in the blood, and were found coiled together in a blood clot contained in the removed scrotal tissue, the operation being performed by Dr. Edward Gayer, of Calcutta. Unfortunately, during the "teasing" of the clot, these specimens were badly injured, resulting in the destruction of the terminal extremities of the male and the caudal end of the

¹The individuals from whom these specimens were taken were not known to harbor embryo-nematodes in their blood (vide Quain's Dic. Med. Art. *Filaria Sanguinis Hominis*, p. 513).

²London Lancet, July, 1877.

³London Lancet, October 6, 1877.

⁴Vide Sir Joseph Fayrer, On the Relation of *Filaria Sanguinis Hominis* to the Endemic Diseases of India. Loc. cit. p. 188.

⁵Indian Medical Gazette, Sept. 1, 1877. Also: Lancet, London, Sept. 29, 1877. Also: Centralblatt für d. Medicinische Wissenschaften, No. 43, 1877. Also: Quain's Dic. Med. Art. *Filaria Sanguinis Hominis*, 512-13. Also: Sir Joseph Fayrer, On the Relation of *Filaria Sanguinis Hominis* to the Endemic Diseases of India, Lond. Lancet, vol. 1, Feb'y 8, 1879, p. 188. Also: Cobbold, Parasites, etc. p. 187.

⁶The term nævoid elephantiasis is synonymous with varix lymphaticus, lymph scrotum, etc.

female. Hence the male¹ specimen was too much mutilated to admit of an accurate description of its specific characters.

In the paper² describing this discovery Lewis objected to the nomenclature employed by Dr. Cobbold, declaring that the appellation of *filaria sanguinis hominis* originally given by him to the embryonal entozoon should be retained for the adult nematode. While it must be conceded that there are valid reasons in favor of Dr. Lewis' proposition, and not the least, the avoidance of much confusion by including both the mature and immature filaria under one and the same designation, still there are also certain well-founded objections to be urged against it; and especially, as suggested by Cobbold, because the name of filaria Bancrofti serves to fix the date and source of the discovery, giving to Dr. Bancroft the credit to which he is justly entitled.

The discovery received additional verification at the hands of Araujo,³ of Brazil, who found the parent worm October 16, 1877; by Dos Santos,⁴ in conjunction with J. de Moura, also of Brazil, in a case of lymphatic abscess of the arm, on November 12, 1877; and by the "find" of Dr. Manson,⁵ of Amoy,

¹This void in our knowledge of the characters of the male filaria was more recently supplied by Prof. A. G. Bourne, of Madras, who secured a perfect male specimen from a case of lymphoid scrotum (vide British Medical Journal, abstract in the Amer. Practitioner and News, No. 65, June 23, 1883, p. 406.)

²London Lancet, Sept. 29, 1877.

³Caso de Chyluria, Elephancia do Escrôto, Escrôto lymphatico, Craw-Craw, e erysipela em um Mesmo individuo; descobrimento da Wuchereria filaria na lympho do escroto. Tratamento pela Electricidade Com Excellentes resultados. Gaz. Med. da Bahia, 2 a Serie, vol. 20, No. 11, Nov. de 1876. Also: Cobbold, Op. Cit. 193-4. Also: Fayrer, On the relation of the Filaria Sanguinis Hominis, etc. London Lancet, vol. 1, Feb. 8, 1879.

⁴Filaria Bancroft: Verificação no Brazil da descoberta de Bancroft, na Australia, Progresso Med., Rio de Jan., 1877-8, 11, 95 100. Also: Gaz. Med. da Bahia, March. 1887. Also: Cobbold, Op. Cit. Also: Fayrer, loc. cit.

⁵Additional Notes on Filaria Sanguinis Hominis and Filaria Disease. China Imperial Maritime Customs. Med. Reports for the half year ended Sept. 30, 1880. Also: The Filaria Sanguinis Hominis and Certain New Forms of Parasitic Diseases, etc. London, 1883, p. 123-7.

Manson also found fragments of the mature female worm in a case of thigh-abscess, Jan. 10, 1881.

China, October 15, 1880, in the diseased tissues of lymph-scrotum.

The cases of Araujo and Manson deserve more than passing mention: Araujo's case was unique and of the greatest clinical and pathological importance, since he harbored not only the mature and embryonic nematodes, but, at the same time, he presented in his own person several of the disorders attributed to the presence of embryo-filariæ, and previously found separately. At first he suffered from chyluria; two years thereafter he experienced several attacks of crawl-crawl; then a second out-break of chyluria appeared, during which attack lymph-scrotum associated with elephantiasis scroti became manifest.

The patient of Manson was of both practical and scientific interest. He was a native Chinaman; male; 46 years old; afflicted with lymph-scrotum. No embryo-entozoa were discoverable in the blood, but were abundant in the lymph discharge; and a live, active, mature female was found occupying a dilated lymphatic vessel on the cut surface of the abscised scrotum. This is the first instance where the true home of the parent could be precisely stated from direct observation, and which, together with the number of recorded¹ cases wherein the immature parasite was absent from the blood, but its presence amply demonstrated in the gland-lymph or lymphous discharges, seems to threaten a revolution, or, at least, a material change in the views at present entertained concerning the hæmatic relations of the embryo-filaria.

Upon these facts Manson bases the theory, and which he considers proven², that the lymphatics—and more frequently the distal vessels—are the chosen and natural habitat of the adult nematode. He argues that the female lying in a lymphatic duct emits her young which are carried by the lymph-current to the lymphatic glands, and having a diameter about equal to the lymph-corpuscles, plus the aid afforded by their own vigorous movements, they readily enter and traverse the gland-tissue. Thus they pass gland after gland, and emerging

¹Observed especially by Manson.

²The *Filaria Sanguinis Hominis*, etc. London, 1883, p. 6.

into the efferent vessels are borne along the stream until the thoracic duct is reached, and finally enter the blood itself.

The next link in the complicated chain constituting the life history of the parasite—a problem worked out by pure inductive reasoning,—was the tracing of the embryo-filaria to the body of the *Culex mosquito*.

That the mosquito might be the intermediary host was first suggested by Bancroft, who informed¹ Dr. Cobbold, in April 1877, that he suspected the larvæ were imbibed by mosquitoes and other suctorial insects whilst engaged in their predatory attacks upon man.

Again, in the summer of the same year, Dr. Manson² reasoning independently by a similar method, that, as the filarial embryo resides and circulates in the blood, the primary step in its development must be its freedom by some agent which abstracts the blood, and hence concluded that the mosquito or sand fly was the medium through which liberation was effected. With a zeal and thoroughness characteristic of this acute and able observer, he lost no time in subjecting this opinion to experimental test, and in quite a short period his efforts were crowned by the actual observation of this human embryo-hæmatozoon in the stomach of the *Culex mosquito*.

He first communicated this discovery on January 4, 1878, in a manuscript to Cobbold, who hastened to give publicity through the columns of the *London Lancet*³ to the main facts connected therewith.

Additional examination convinced Dr. Manson that every variety of this *Culex* did not possess the requisite qualifications to serve as the intermediate host, but that such was limited to the female of a particular species of mosquito, and which he describes.

¹Letter to Cobbold (Vide Cobbold, Op. Cit. p. 192).

²China Imper. Customs, Medical Reports No. xiv, 1878. Also. Linnæan Soc. Jour. of Zoology, vol. xiv. p. 304. Also: *Filaria Sanguinis Hominis* and Certain New Forms of Parasitic Disease, etc. London, 1883, p. 10.

³London Lancet, January 12, 1878, vide also: Manson On *Filaria Sanguinis Hominis*, and on the Mosquito Considered as a Nurse. Proc. Linn. Soc. March 7, 1878. Also: "Nature," March 28, 1878, p. 439.

He then demonstrated that the female of this special variety penetrating the skin of a victimized subject, deeply buries her proboscis in the blood-current, and to which the circulating embryos quickly adhere, becoming attached or entangled by means of their lashes¹ or loose chorional envelopes. Being securely held in this manner they are the more readily conveyed in large numbers along with the blood to the stomach of the mosquito; and after thus gorging herself she repairs to water to fulfil the chief aim of life—the deposit of her ova.

Many of the embryo-nematodes are digested or expelled in the excreta, but a few, obedient to the decree of the survival of the fittest, remain to undergo interesting developmental changes. These changes require from four to six days for completion, and at the expiration of this period the metamorphosed filariæ are then discharged either with the larvæ, or gain their liberty by boring through the body of the insect after dissolution, and thus probably escape into the water in the state of free nematodes.² Through this medium infection undoubtedly occurs either by the avenue of the mouth—being swallowed in potable water, or by penetrating the skin of bathers; but this is simply conjectural, and hence a broad hiatus exists here in our knowledge of the wonderful life-cycle of the animal, which will require both time and a peculiar association of propitious circumstances to bridge-over.

On re-entering the human body, whether directly or possibly through the agency of another bearer, it soon reaches sexual maturity and seeks its destination in the lymphatic system—probably a distal branch,—where it is accompanied or followed by the male, and conjunction of the sexes takes place.

¹Dr. Manson believes that the lash is a special provision to thus aid in accomplishing the passage of the *filaria sanguinis hominis* to the intestinal tract of the mosquito.

²Dr. Pedro S. de Magalhães, of Rio de Janeiro, found microscopic nematodes in the drinking waters of Rio (Aqua da Carioca), which he thinks may be genetically related to *Filaria Bancroftii*. This relation, however, Dr. Cobbold rejects (Vide *Filarias em estado Embryonario*; encontrados Niagua tida Como potaval (agua da Carioca). *Progresso Med Rio de Jan.* 1877, 57-62 Also: *Gaz. Med. da Bahia*, 1878, 2. s., 111, 14-19, Dezembro. Also: *Nota Sobre os nematodes encontrados no Sedimento deposito pela agua (potavel) da Carioca.* *O Progresso Med.* 1 de Setemb. 1878, p. 577. Also: Cobbold, *Op. cit.* p. 194.

Speaking of this important rôle of the mosquito in an article¹ published in 1878, Dr. Lewis, of Calcutta, stated that he had made frequent examinations, but in a cursory manner, of both this and other suctorial insects, in quest of these filarial guests, and always negatively; when, a few months prior to that writing, he received a communication from Dr. Manson which directed his attention anew to the subject. Great then was his surprise to find that four out of eight mosquitoes, captured at random in one of the servant's houses, harbored specimens of hæmatozoal embryos identical, apparently, with those he had previously seen in man.

These researches were conducted with considerable caution; and from these later inquiries he was convinced that although a great number of the ingested hæmatozoa are digested, "nevertheless others actually perforate the walls of the insect's stomach, pass out, and then undergo developmental stages in its thoracic and abdominal tissues." Therefore he was able from personal knowledge to add a positive voice in substantiation of Manson's discovery.

Dr. da Silva Lima, of Brazil, wrote² to Dr. Cobbold, in the month of September, 1878, announcing the fact that Dr. Araujo had verified the presence of the embryos of *Filaria Bancrofti* in mosquitoes, at Bahia. These mosquitoes had fed upon the blood of a French priest, in whom embryo-filariæ were known to exist.

This was speedily followed by a similar announcement from Bancroft,³ who sent, from Brisbane, some filariated mosquitoes⁴ to Dr. Cobbold, on April 15, 1879, which had feasted upon the blood of a filaria-infested patient.

¹T. R. Lewis: Remarks Regarding the Hæmatozoa Found in the Stomach of the Culex Mosquito. Proc. Asiatic Soc.-Bengal, March. 1878, p. 89. Also. Cobbold, Op. Cit. p. 196-7.

²Cobbold, Op. Cit. p. 198.

³Cobbold, Op. Cit. Appendix, p. 487.

⁴Bancroft detected forty-five filariæ in the body of a single mosquito obtained from this source.

Again, Dr. Prospero Sonsino, of Cairo, soon reported¹ that he too had recently witnessed the metamorphosis of the filaria in the body of the mosquito, having encountered the embryos and watched the process of development in nine out of thirty-six mosquitos examined.

These were the mosquitoes ordinarily found about Cairo.

Thus the mosquito as the true secondary or intermediary bearer of the *filaria sanguinis hominis* became an established fact,—founded upon the firm basis of direct and repeated observation.

Viewed from a physiological stand-point, perhaps the most curious and remarkable feature connected with the entire subject of the *filaria sanguinis hominis*, and with which the name of Manson is also intimately and inseparably associated, is the singular phenomenon not inaptly designated by Cobbold as *filarial periodicity*.²

In examining the blood of filaria-bearing persons, Dr. Manson noted the fact that the embryos were sometimes markedly diminished in, and frequently temporarily absent from, the general circulation,—particularly during the diurnal hours. Appreciating that he had recognized a condition of unusual import, but realizing the numerous difficulties which beset the path to an explanation, he determined to attempt an investigation of the rationale of these disappearances. Consequently, he instituted a series of systematic observations in a number of patients, with the result of learning that, “unless there is some disturbance, as fever, interfering with the regular physiological rhythm of the body, filaria embryos invariably begin to appear in the circulation at sun set; their numbers gradually increase till about midnight; during the early morning their numbers become fewer by degrees, and by nine or ten o’clock in the forenoon it is a very rare thing to find one in the blood.”³ Hence it became

¹*Filaria Sanguinis Hominis, Lymphocoele, Lymphuria, and other Associated Morbid Disorders; with a Hint of other Worm Diseases in Egypt.* Med. Times and Gazette, May 27, 1882, p. 554. Also: Manson, Op. Cit. p. 11, note. Also Cobbold, Op. Cit. p. 192.

²Manson, in China Imper Customs Med. Reports, xxiii, p. 36. Also: The *Filaria Sanguinis Hominis*, etc., London, 1883, p. 32, *et seq.*

³Manson, Op. Cit., p. 34.

obvious that what at first appeared to be only irregular happenings, were in reality attended by the most precise and absolute regularity; in a word, that the embryos always desert the circulation during the day, and as surely and uniformly re enter it on the going down of the sun, and increase in numbers with the approaching hours of night.¹ Dr. Manson did not have to seek long for the interpretation of this peculiar periodicity. His discerning mind at once saw in it a beautiful example of the operation of a grand natural law, namely, the adaptation of the habits of the filaria to the nocturnal wanderings of its indispensable liberator and secondary host,—the mosquito.

But whilst the object of this periodicity was apparent, the cause, agency or producing force was shrouded in obscurity, and, indeed, remains unelucidated.

Just here the queries naturally arose: Whether the periodic absence of the filarial embryos was caused by their death, and the appearance of a new brood every twenty-four hours; and, If not occasioned by dissolution, then what and where was the chosen place of their concealment during the hours of retirement? In order to determine these pertinent questions Dr. Manson resorted to experiments upon, and post mortem examinations of, dogs infested with the *filaria immitis*,—a hæmatozoon very analogous to *filaria sanguinis hominis*. These investigations disclosed the fact that there is a certain imperfect periodicity, or, in other words, a periodic remission in numbers in the canine hæmatozoal embryos; and, again, that instead of dying and disintegrating during these remissions they are to be found resting in the minutest ramifications of the pulmonary artery. Therefore, he very reasonably concludes that something similar takes place with the human parasite, and that they do not die, but lie resting and waiting for the evening hours in some of the thoracic or abdominal organs.²

¹Manson's recognition of filarial periodicity was confirmed by Dr. Myers, of Formosa, Dr. Stephen Mackenzie, of London, Dr. Rennie and Dr. Adams, of Foochow, and others.

²Dr. W. Wykeham Myers thinks that filarial periodicity is due to the embryos

On account of the periodicity being one of every twenty-four hours, Manson suggested the proposition that it might be influenced possibly by the regular diurnal revolution of the earth,¹ operating either directly upon the parasite in the human blood by means of some of the regular quotidian and rhythmic fluctuations in the meteorological conditions produced thereby,—as rise and fall of temperature, differences of atmospheric pressure, the waxing and waning of light, and variations in terrestrial magnetism; or, indirectly, by inducing in the human bearer certain daily and methodic habits upon which depend the actions of the nematoid embryos,—such as the periods of waking and sleeping, evening rise of body temperature, exercise, the time of taking food, and such like.

Subsequent systematic observations by himself, together with examinations by others, however, enabled him to eliminate the *direct* operation of these influences, and hence he now considers that “filarial periodicity is dependent, not on meteorological conditions resulting from the daily revolution of the earth, but on the *habits* this great fact impresses on the human body.”²

As having a special bearing upon this opinion must be men-

possibly dissolving away in the blood every twenty-four hours, rather than retreating to some organ, cavity or part of the blood-vessel system as believed by Manson. The languid condition of the embryos found in the morning is the basis of this belief, but the theory is very unstable because founded upon examinations in a single case (vide observations on *Filaria Sanguinis Hominis* in South Formosa. China Imper. Customs Med. Reports, II Special Series No. 2. Half year ended 31st March, 1881, 21st issue.) This theory was refuted by Manson (Op. Cit. p. 92, *et seq.*) but, it must be added that Dr. Prospero Sonsino agrees with Myers that the life of the embryo-filaria in the blood is short and ephemeral, although he was unable to substantiate the assertion that the filariæ in blood drawn at night are always more vigorous and active than those in blood taken in the diurnal hours. (*Filaria Sanguinis Hominis*, Lymphocele, Lymphuia, and other associated morbid disorders; with a Hint of Other Worm-Diseases in Egypt. Med. Times and Gaz. May 27, 1882, p. 554.)

¹Manson, Op. Cit. Chap. II, p. 32, *et seq.* Also: On the Periodicity of Filarial Migrations to and from the Circulation. China Imper. Customs. Med. Reports. Half year ended 30th Sept., 1881, 22nd issue.

²Manson, Op. Cit., p. 54.

tioned the theory of Dr. Mortimer Granville¹, who thus briefly formulates his ideas: "The modifications of blood-current and pressure, of the relative amounts of oxygen and carbonic acid received into or liberated from the blood, of the relative temperatures of the blood and the tissues, and the chyle current, which are concomitant or consecutive to the sleep-state, are, I believe, essential to the appearance of the filariæ in blood." Closely connected with, and the most decided step towards bringing about, these conclusions in regard to the phenomenon of filarial migration as they stand at present, and which, fortunately, has largely circumscribed the field of research, was Stephen Mackenzie's discovery of the *inversion of filarial periodicity*,² which was effected by simply changing the habits of sleeping and waking in a filariated patient.

Notwithstanding that filarial periodicity is still in the dark, and that much remains to be accomplished before its significance will be correctly understood and thoroughly appreciated, there are several points which may be fairly considered to be practically demonstrated, as follows: Filarial periodicity is unaffected by either continued watching, or change in the hours of eating; but it is possibly disturbed by prolonged sleep, and by increase in body-heat or the febrile state.³

¹"*Filaria Sanguinis Hominis and Fever*" (letter by J. Mortimer Granville, dated Feb'y 20th, 1882), London Lancet, Feb'y 25th, 1882, vol. i, p. 314.

²On October 18th, 1881, Dr. Stephen Mackenzie exhibited to the Pathological Society the subject of this experiment, who was a soldier having served in India, and then an inmate of the London Hospital.

Filarial inversion was confirmed by Manson, who verified and varied Mackenzie's experiments (On the Periodicity of Filarial Migrations to and from the Circulation, China Imp. Customs Med. Reports. Half year ended 31st March, 1882, 23rd issue, pp. 5 and 6. Also: The *Filaria Sanguinis Hominis*, etc., London, 1883, p. 54, *et seq.*)

³It should be mentioned that in two cases in which the influence of chloroform upon filarial periodicity was noted, in one no effect was observable, but in the other the administration of the anæsthetic seemed to cause the appearance of the embryos in the circulation at an hour when they are to be considered normally absent. (Manson, Op. Cit. pp. 94 and 105.)

In this connection an important observation was made by Dr. DeSaussure, of Charleston, S. C., on a filariated negress under his professional charge, who was pregnant. The filariæ existed in the blood the night before labor, but immediately after labor they were absent. Subsequently, however, they again appeared in the blood. Blood from the cord did not contain the embryos (vide case 8, table of cases in this article).

We now come to the consideration of the finding of the filaria in the United States.

Had Dr. Salisbury been more specific in his description of the new species of nematode which he found in the human bladder in 1868 (*vide supra*,) and particularly had he furnished an accurate and detailed history of the patients from whom these minute organisms were obtained,—especially as to their nativity and the absence of residence in a tropical latitude, we might have been able to accord to him the honor of discovering the parasite on this Continent. But, with the existing status of the subject, to Dr. John Guitéras, of the U. S. Marine Hospital Service, is due the full credit of being the first to demonstrate that the *filaria sanguinis hominis* is a native, or at least, a thriving colonist of the southern portion of the United States.¹

In 1884, whilst stationed at Key West, Florida, Dr. Guitéras discovered the embryo-filaria in the blood of four persons, but all of these were from the Island of Cuba, and hence the cases were easily traceable to a non-American origin.² However, he recognized then that the local conditions and surroundings were favorable to the indigenous life of the worm.

On going to Charleston, in 1885, he found there a climate quite similar to that of South Florida; also that the city had been for years in constant commercial intercourse with the West Indies; that elephantiasis was not infrequently met with; that mosquitoes abounded; and that cistern water without filtration was in very general use for drinking purposes. These facts seemed to offer every requirement necessary for and conducive to the existence and developmental cycle of the filaria; and, therefore, he made known his belief to other practitioners of the town, and began himself a systematic look-out for the parasite.

¹The *Filaria Sanguinis hominis* in the United States—Chyluria, by John Guitéras, M. D., Medical News, April 10, 1886, p. 399.

²The filaria has been found in the United States in a few other non-indigenous cases, among which may be mentioned the patient of Drs. Abbé (New York Medical Journal, Feby. 1880) and C. E. Hackley (Further Notes on a Case of *Filaria Sanguinis Hominis*, Archiv. Med., N. Y., 1882, viii, 142-148. Also: Reprint. Also: *Filaria Sanguinis Hominis*: Buck's Reference Hand Book of the Medical Sciences. pp. 156-57.)

His searches were unsuccessful until February 13th, 1886, when he examined with Dr. P. G. de Saussure, of that city, a case of chyluria from the clientelage of Dr. J. J. Edwards, by whom the existence of the parasite was suspected, and in whose blood filariæ were found in plentiful numbers. This patient was a mulattress, a Charlestonian by birth, and had never been out of the city except during a residence of five years in Augusta, Georgia. Her history rendered it impossible to say in which location she had acquired the malady, but Dr. Guitéras was inclined to regard Charleston as the most probable place of origin, especially on account of the source of the potable water supply.

The seed thus sown by Guitéras flourished and brought forth early fruit, for, within the same year, three additional cases were noted in rapid succession. The first¹ of these occurred also in the practice of Dr. Edwards, who recognized and referred it to Dr. Guitéras, on March 6. This was in the person of a negro man suffering from chylocele, associated with commencing elephantiasis scroti, and whose blood teemed with the hæmatozoal embryos. He had never been beyond the limits of the immediate vicinity of Charleston, and hence the place of infection did not admit of question. The other two cases² were under the professional charge of Dr. de Saussure. One was a negro man, born and reared in Charleston, the subject of chyluria, and presented the embryos in both the blood and urine; the other was a mulatto woman, at the advanced age of one hundred years, who was born in San Domingo, but had been a resident of Charleston since early life. She was insane, and had superficial abscesses. The filariæ were in the blood.

In 1887 six cases³ were observed. Five of these occurred in Charleston, and among which were four chylurics, the patients of Dr. de Saussure, and one affected with lymph-scrotum, under the surgical care of Dr. R. A. Kinloch. The

¹Guitéras, loc. cit. note, p. 402.

²Guitéras in MS. to the writer.

³Ibid.

embryos were in the blood of all, besides being additionally in the urine of one. The only other noteworthy feature connected with them, was in one of the patients of Dr. de Saussure, a negress, æt. 32 years, laundress by occupation, and in the last month of pregnancy. The night preceding labor the filariæ were present in the blood in the usual numbers, but were absent immediately after accouchement, which took place at ten o'clock P. M. Subsequently, however, they reappeared in the circulation. Blood from the cord did not contain the nematodes. This is an important and valuable observation, and may serve to shed some light on the obscure but interesting subject of filarial periodicity.

So far in 1888, three cases¹ have been met with. These were seen by Drs. John Guitéras, J. L. Dansen, Jr., and de Saussure, respectively. Chyluria was the pathological conditions present in each, and filariæ existed in the blood.

In order that the prominent and essentials points of these cases, including all the American cases, may be the more readily observed, I have arranged them in the subjoined tabular form. In this table cistern water is indicated as the principal source of the potable water in the Charleston cases; but in reference to this it is necessary to remark, that rain water was not exclusively drank by these individuals, since they all partook more or less frequently of the artesian water of the city water supply. "This water is exposed in a pond before going into the pipes, and may be infected with filarious mosquitoes."²

There now remains to be considered the case, belonging to the group of 1887, which came under my personal observation, and which forms the basis of this essay.

J. P. Mallon, a cabman by occupation, æt. 22 years, white, born in Mobile, of Irish parentage, brunette, of slender frame but moderately robust, consulted Dr. C. H. Mastin, (Senior), on September 27, 1887, in relation to an enlargement of the left testis. Inquiry elicited these points in his history: There is no history of either hereditary

¹MS. letter from Dr. Guitéras to the writer.

²Guitéras, in MS. letter to the writer.

or acquired disease. His father died of acute cerebral congestion at the age of 53; but his mother is still living in the enjoyment of good health, as are also the other members of his family, consisting of two brothers and two sisters. His own health has always been excellent and, with the exception of the usual diseases incident to childhood and a short attack of "chills and fever" in the fall of 1885, has never suffered from fever or, indeed, any serious or recurring illness of any kind. Never had milky or bloody urine. His appetite and digestion are good, but he complains of nervousness and disturbed sleep, the result, probably, of irregular hours consequent upon his occupation of night cabman. Habits are good; is not a drinker, although indulges in an occasional glass of beer. His residence is located in a malarious portion of the city. He has never been out of Mobile and its immediate vicinity. The water ordinarily consumed for drinking purposes by himself and family is supplied by the "City Water Works", but occasionally derived from a drovo-well, the former being pumped up from a clear flowing creek into an open reservoir from which distribution is then made. Does not remember to have drank cistern or tank water, or any standing uncovered water. Eight years ago his right testicle passed up into the inguinal canal, where it has since lodged, and which he attributes to horseback riding, although he has no recollection of any injury connected therewith. The left testicle began to enlarge three years ago, was without pain, and, indeed, the only discomfort experienced therefrom is the inconvenience resulting from its bulk.

Examination shows him to be fairly nourished and apparently in good general health. The right testicle is atrophic, insensitive, and occupying a fixed position about the center of the inguinal canal. The left testis has the dimensions of a medium sized pear, is pyriform in contour, fluctuating, semi-translucent (by transmitted light), and painless, in a word, presenting the characteristic features of an ordinary hydrocele. The glands in both inguinal spaces are moderately enlarged and in chains,—each gland being easily outlined and traced to its association with another. There are also a few enlarged glands in the right axilla and the right cervical region, but no other lymphatic involvement is discernible, and, in fact, there is no evidence of any other disease whatever. The left tunica vaginalis was now tapped and $4\frac{1}{2}$ ounces of milky fluid withdrawn. Testicle neither enlarged nor painful. This fluid was alkaline in reaction, albuminous, of a yellowish milky color, and, as shown microscopically, contained numerous fat granules, some leucocytes, casts, and epithelial scales, and *embryonal entozoa* in active motion. Since then the sac has

slowly refilled, and has been retapped twice, namely, November 7, 1887, when about $\frac{1}{2}$ ounce was removed, and three slides examined with the result of finding 14 of the embryo-menatodes; and May 19, 1888, with the removal of 1 ounce of fluid and a "find" of 5 embryos in three slides. These were all active and vigorous, and remained alive until desiccation of the liquid medium. Repeated blood examinations¹ were made, but always with negative results, although great care was observed in conducting them, and with due regard for filarial migration and inversion of this periodicity.

The embryo-filiariæ from this case are accurately delineated in the accompanying illustrations—taken from photo-micrographs prepared by Dr. W. M. Gray, of Washington.

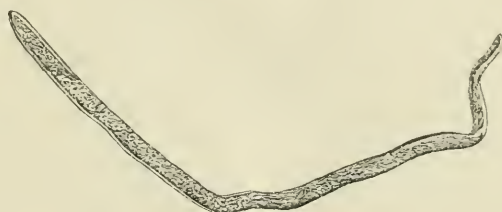


FIG. 1.—FRESH SPECIMEN OF EMBRYO-FILARIA SANGUINIS HOMINIS, FROM CHYLOCELE FLUID. $\times 300$ DIAMETERS. (Photo-micrograph by Dr. W. M. Gray, Surgeon General's Office, Washington).

Figures 1 and 2 show the dead animal in the fresh chylocele fluid, and in which is seen the granular appearance or markings resulting from post mortem changes.

¹These examinations were made with a low power, at the following dates and hours:

Oct. 20, 1887,	7	P. M.	-	Blood from finger tip ;	1	slide examined.
" 21,	"	9	"	"	"	1
" 22,	"	2.30	"	"	"	2
" 22,	"	11	"	"	"	2
Nov. 7,	"	12.30	"	"	"	1
" 23,	"	11	A. M.	"	"	1
" 23,	"	4	P. M.	"	"	1
" 23,	"	8	"	"	"	2
May 20, 1888,	9	"	-	"	"	3
" 25,	"	11	"	"	"	1

The specimens in Figure 3 were preserved in a HgCl_2 solution and then stained with eosin. These figures exhibit beautifully the characteristic sheath or chorionic sac, from which the worm has retreated, giving it the appearance of being enclosed in a loose bag. This external envelope resisted the action of staining fluids.

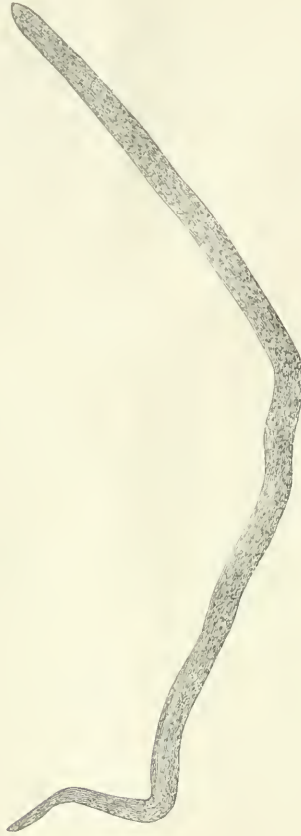


FIG. 2.—The same as Figure 1, $\times 650$ diameters. (Photo-micrograph by Dr. W. M. Gray, Surgeon General's Office, Washington.)

What is the real etiological and clinical import of the presence of the mature¹ parasite, its ova and embryos in the

¹It has been suggested with much reason that the mature worm may be as productive of diseased conditions as the embryonal forms.

blood-and lymph-systems? That it does possess a pathological significance of much importance and many phases must be conceded; and, notwithstanding the assertion, by several writers amply qualified to speak authoritatively on the subject, that the hæmatozoon does not always, or even generally, produce diseased conditions, and that guest and host may dwell together for years¹ in harmonious association, there are suffi-



FIG. 3.—STAINED SPECIMENS OF EMBRYO-FILARIA SANGUINIS HOMINIS FROM CHYLOCELE FLUID $\times 300$ DIAMETERS. (Photo-micrograph by Dr. W. M. Gray, Surgeon General's Office, Washington).

¹There are many examples attesting to the longevity of the animal. Dr. Lewis speaks of one patient in his practice in whom the filariæ were known to be present for two and a half years, and believes that they have no tendency to develop beyond a certain stage while in the circulation. (Eighth Ann. Rep. of the San. Comm.

TABLE OF FILARIA—CASES IN THE UNITED STATES.

No.	Age Sex. Color.	Occupation.	Date of Discovery	Pathological Condition Present.	Nativity.	Residence.	Fluid Containing Filaria.	Source of Potable Water.	Authority.	Remarks.
1	F 40	Seamstress.	Feb. 13, 1886.	Chyluria.	Charleston, S. C.	Charleston, S. C.	Blood.	Cistern water principally.	Jno. Guiteras in Med. News, April 10, 1886, also M.S. letter to writer.	This case occurred in the practice of Dr. J. J. Edwards, who suspected filaria, and the presence of which was demonstrated microscopically by Drs. Jno. Guiteras and P. G. de Saussure.
2	M 20	Laborer.	March 6, 1885.	Chylocele, commencing elephantiasis scroti and mitral lesion.	Charleston, S. C.	Charleston, S. C.	Blood.	Cistern water principally.	Jno. Guiteras in Med. News, April 10, 1886, also M.S. letter to writer.	This case also in practice of Dr. J. J. Edwards, micro- scopic examination by Drs. J. Guiteras and de Saussure, death from mitral lesion, no autopsy.
3	M 55	House Servant.	1886.	Chyluria.	Charleston, S. C.	Charleston, S. C.	Blood and urine.	Cistern water principally.	M.S. letter from Dr. Jno. Guiteras.	Case in practice of Dr. de Saussure, who detected the filaria
4	F 100	House Servant.	1886.	Superficial abscess, in- sanity.	San Domingo.	Charleston, S. C.	Blood.	Cistern water principally.	MS. letter from Dr. Jno. Guiteras.	Patient of Dr. de Saussure, sent to insane asylum, Co- lumbia.
5	M 30	Constable.	1887.	Hemato-chy- luria.	Charleston, S. C.	Charleston, S. C.	Blood.	Cistern water principally.	MS letter from Dr. Jno. Guiteras.	Patient in practice of Dr. de Saussure, lived in Nassau during late war.
6	M 65	Carpenter.	1887.	Chyluria-dys- entery.	Charleston, S. C.	Charleston, S. C.	Blood.	Cistern water principally	MS. letter from Dr. Jno. Guiteras.	Patient of Dr. de Saussure, had frequent attacks of in- testinal colic.

7	M	22	W	Cab-driver.	Sept. 1887.	Chylœcele.	Mobile, Ala.	Mobile, Ala.	Chylœcele fluid.	Usually from city water works.		Patient of Dr. C. H. Mastin (senior), microscopic examination by Dr. Wm. M. Mastin.
8	F	32	N	Laundress.	1887.	Chyluria.	Charleston, S.C.	Charleston, S.C.	Blood.	Cistern water principally.	MS. letter from Dr. Jno. Guiteras.	Patient of Dr. de Saussure, the filaria were found in the blood the night before labor, they were absent immediately after labor, but were present subsequently, not found in blood from the funis.
9	M	55	W	Nurse.	1887.	Lymph - scro- tum, enlarged groin glands.	Ireland.	Charleston, S.C.	Blood.	Cistern water principally.	MS. letter from Dr. Jno. Guiteras.	Patient of Dr. de Saussure, microscopic examination by hospital physician, groin glands removed by Dr. Kinloch.
10	M	30	W	Lawyer.	1887.	Hemato - chy- luria.	Charleston, S.C.	Charleston, S.C.	Blood and urine.	Cistern water principally.	MS. letter from Dr. Jno. Guiteras.	Patient of Dr. Kinloch, microscopic examination by Dr. G. N. Guiteras.
11	M	18	M	Sailor.	June 14, 1888.	Hemato - chy- luria.	Charleston, S.C.	Charleston, S.C.	Blood.	Cistern water principally.	MS. letter from Dr. Jno. Guiteras.	Patient in Marine hospital, under charge of Dr. Jno. Guiteras.
12	M	45	W	Bookkeeper	June 1888.	Chyluria.	Charleston, S.C.	Charleston, S.C.	Blood.	Cistern water principally.	MS. letter from Dr. Jno. Guiteras.	Patient of Dr. J. L. Danson, Jr., this man often been on fruit vessels from Cuba, and may have taken water on board, has had chyluria since 1872.
13	M	58	N	House cleaner.	June 1888.	Chyluria.	Charleston, S.C.	Charleston, S.C.	Blood.	Cistern water principally.	MS. letter from Dr. Jno. Guiteras.	Patient of Dr. de Saussure, his wife probably also affected.

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cient grounds for assuming that a filaria-infested individual is rarely, if ever, in a state of absolutely perfect health.

The numerous observations upon and recorded instances of filarious diseases plainly show that the lymphatics are the principal, and, indeed, it might almost be said the sole seat of the parasitic attacks and manifestations. But whilst this is acknowledged, and, in addition, that lymphous discharges should be regarded as a symptom highly indicative of the existence of the parasite in the tissues, especially when occurring in tropical climates, yet more information is needed before it can be admitted with such positiveness, as declared by an intelligent and experienced observer, "that chylo-serous effusions may be considered as symptomatic of the parasitism."²

An idea of the number,³ variety and character of the pathological changes referred to the presence of the worm can be readily obtained from a glance at the list contained in the following selected paragraphs. These quotations, as will be seen, are taken from authoritative sources, and comprise in the main those lesions the parasitic nature of which may be considered practically proven.

Dr. Bancroft, writing to Cobbold in 1877, remarks that he had on record,

"About twenty cases of this parasitic disease, and believes it will be the solution of chyluria, one form of hæmaturia, one form of spontaneous lymphatic abscess, a peculiar soft varix

with the Govm't of India, 1871, Calcutta, 1872, Appendix E. p. 269). Dr. Hackley's case shows a duration of fully ten years (loc. cit.); and Manson mentions a patient who had played the rôle of filarial host for 32 years (*Filaria Sanguinis Hominis*, etc., London, 1883). All of these cases, however, suffered from well-marked diseased conditions due to the presence of the parasite.

²T. R. Lewis. Quain's Dictionary Med. Art. Chyluria, p. 253.

³Dr. Manson (*Filaria Sanguinis Hominis*, 1883, p. 74) has collected statistics to show that on an average in Amoy (China) and the surrounding districts, about one in every eight persons bears the *filaria sanguinis hominis*; and that the embryo-nematodes will be found once in every thirteen individuals examined.

Dr. J. L. Paterson ("Veterinarian," June, 1879. Also: Cobbold, Parasites; etc., p. 201) and Dr. Hall (Cobbold, loc. cit.) have ascertained that the proportion of the population of Bahia, Brazil, affected by the parasite is equivalent to eight and a half per cent.

of the groin, a *hydrocele containing chylous fluid*, together with some forms of varicocele and orchitis.”¹

² He stated further that there were no cases of elephantine leg in the colony, or scrotal elephantiasis, or lymph-scrotum, but he believed the parasitic nature of these would be established.

A few years later Dr. Bancroft was able to extend this register of filarious diseases, and then wrote that the following conditions were probably associated with filaria:

“Chyluria, hæmaturia, anemia, tuberculosis, *hydrocele with milky fluid*, varicocele, elastic tumors in axilla and groin (helminthiasis elastica), lymph-vesicles bursting on scrotum and abdomen, skin diseases (crawl-crawl), acute orchitis, lymphangitis with fever, erysipelatous lymphangitis leading to hypertrophy of skin (elephantoid fever in short), elephantiasis of scrotum; and abscess of scrotum, of glands of neck (like struma), of the lymphatics of arm and thigh, intra-pelvic abscess, peculiar steatoma of face, venous varix, cerebral abscess and other lesions of the brain.”²

Sir Joseph Fayrer says:

“It has been shown that disorders of the lymphatic system are most frequently associated with, if not caused by, the filaria; also nævoid and ordinary elephantiasis Arabum; perhaps also elephantiasis Græcorum,³ chyluria, hæmaturia, *hydrocele*, and affections of the cord and testis, lymph varix and abscess, diarrhœa,⁴ fever, cachexia, deterioration of general health, certain skin diseases (crawl-crawl), deafness, eye⁵ diseases.”⁶

¹Vide Cobbold, Parasites: etc., p. 187.

²Vide Sir Joseph Fayrer, London Lancet, vol. I, Feb. 15, 1879, p. 222.

³Dr. Manson believes that Elephantiasis Græcorum or leprosy is never produced by the parasite (The Filaria Sanguinis Hominis, etc., 1883, p. 3. Note).

⁴Dr. Guitéras (loc. cit. p. 402) was struck with the constancy of symptoms of intestinal dyspepsia accompanied by diarrhœa and often enteralgia, in the filariated cases which have come under his observation.

⁵Dr. Lewis found in a case of parasitic chyluria associated with granular lids and inflammation of the eyes, that a milky or chylous exudate flowed from the corners of the lids containin filariæ (Eighth Ann. Rept. San. Comm. with Govm't of India, 1871, Calcutta 1872. Appendix E. p. 247. Also: Fayrer, loc. cit. p. 188. Also: Cobbold, op. cit. p. 184).

⁶On the Relation of Filaria sanguinis Hominis to the Endemic Diseases of India, London Lancet, vol. I, Feb. 15, 1879, p. 221.

Dr. Prospero Sonsino gives a record of ten cases connected with filaria as follows :

"1st Case, had deafness and attacks of ephemeral fever, and Bilharzia disease; 2nd case, elephantiasis scrotalis and preputialis, abscess in thigh, diarrhœa and marasmus; 3rd case, lymphuria; 4th case, lymphuria and emaciation; 5th case, *lymphocele* (*milky hydrocele*); 6th case, *lymphocele* (*milky hydrocele*); 7th case, lymphuria with anemia and weakness; 8th case, lymphuria with anemia and weakness; 9th case, emaciation, chronic pneumonia, partial muscular disorders; 10th case, Bilharzia disease."¹

And again, Dr. Manson asserts that "elephantiasis and allied diseases are much more frequently associated with the parasite than is any other morbid condition."²

The American cases comprised chyluria, hæmato-chyluria, *chylocele*, superficial abscesses, elephantiasis scroti, lymph-scrotum and groin glands, and with some of these was associated diarrhœa and dysentery.

The nature of the morbid processes just detailed not only bears out the assertion that the presence of filaria in the body is most commonly, and possibly always, evidenced through derangements of the lymph-system, but also it indicates that such manifestations are principally confined to the lymphatic divisions and radicles supplying the lower half of the body, and particularly those distributed to the pelvis and the urinary and genital organs. Hence, this nematoid hæmatozoon holds a place of no mean significance in the pathology of genito-urinary affections.

Manson's series of extensive examinations furnish additional exemplification of these facts, especially the latter, showing that elephantoid diseases, and, too, of the lower extremities, comprising elephantiasis of leg and of scrotum, lymph-scro-

¹Filaria Sanguinis Hominis, Lymphocele Lymphuria, and other Associated Morbid Disorders; with a Hint of Other Worm-Diseases in Egypt. Med. Times and Gaz. March 13, 1882, p. 294.

²The Filaria Sanguinis Hominis, etc, 1883, p. 80.

tum, enlarged and varicose groin-glands¹, constituted 58 per cent² of the filarious cases.

Chyluria, hæmato-chyluria, and hæmaturia together also give as large, and, in some countries³ perhaps a larger proportion of cases. Dr. Lewis⁴ considered all cases of chyluria occurring in India to be parasitic, since he found the embryos in nearly every instance, and, consequently, judged that the malady was local and intimately connected with a tropical climate. At the same time, he believed that obstructing causes other than that resulting from the helminth might produce the affection.⁵

In the opinion of Dr. Bancroft⁶ chyluria probably always has a filarial origin in Australia, where, also, it is exceedingly frequent; and Dr. Manson⁷ affirms that the majority of the cases met with in Amoy are filarious, and, furthermore, it is his experience that in five out of every six examples of the malady, where suitable and diligent search was made, the hæmatozoon has been discovered both in the blood and urine.

The observations of Dr. Guitéras lead him to the conclusion that chyluria is the most usual expression of the parasite in North America,⁸ although he distinguishes two groups, the

¹Manson is convinced that "varicose groin-glands, lymph scrotum, elephantiasis and chyluria are pathologically the same disease." (Cobbold, op. cit. p. 199.

²The *Filaria Sanguinis Hominis*, 1883, p. 80, table.

³Out of thirty cases of chyluria collected by Roberts (*Urinary and Renal Diseases*, London, 1876, art. Chyluria), twenty-four of the number were either born or had resided in the Mauritius, Isle of Bourbon, Brazil, West Indies or India; and it is declared upon excellent authority that in these and other tropical countries the affection prevails endemically. Here climate is a markedly predisposing cause, and that cause resides, undoubtedly, in the presence of the parasite.

⁴Vide Cobbold, *Parasites*, etc., p. 184.

⁵Dr. Prospero Sonsino (of Cairo) remarks that in one case of lymphuria (chyluria) he was unable to find the embryo-nematode in either the blood or urine. This, of course, has been noted in other similar instances.

⁶Vide Cobbold. Op. cit. p. 187.

⁷*Filaria Sanguinis Hominis*, etc., 1883, p. 90.

⁸Dr. Guitéras states (MS. letter to writer) he has learned that chyluria has been frequent for many years in Charleston.

parasitic and the idiopathic, the latter largely predominating in frequency.

Out of the thirteen United States cases, nine were affected with chyluria and hæmato-chyluria. All four of the Cuban cases mentioned by Guiteras had chyluria.¹

Probably coming next in the order of occurrence is chylous dropsy of the testicular vaginal tunic, known as *chylocele* or *chylous-hydrocele*.² This effusion is usually composed of a pure chylous or a chylo-serous liquid, coagulable, and of a lacteous or opalescent color; but, not infrequently, it may be apparently only a clear serous-like fluid, identical with an ordinary simple hydrocele, without the appearance of chyle admixture, and yet possess chylous or lymphous properties, and be produced by and contain filariæ.

In a tabular statement of sixty-two examples of filarious disorders, Manson³ records six instances of "hydrocele;" and, he asserts, also, that it is not an infrequent accompaniment of filaria disease, and, perhaps, the only symptom of it.⁴

By reference to the lists, already mentioned, of Bancroft, Fayrer, and Sonsino, it will be observed that to this form of dropsy or effusion, termed by them severally "lymphocele," "milky-hydrocele," or "hydrocele," is given prominent notice and position.

Again, among the thirteen filarious cases in the United States, two were of this affection, or, in other words, chylocele stood in the ratio to the total number of cases as two to thirteen. Hence, the proportional frequency of this form of filaria manifestation, together with the sufficiently common occurrence of hydrocele in all countries, especially in some warm climates,—it having been shown to be very frequent in the East Indies, and that in Brazil one man in every ten is affected with

¹Vide Guitéras, loc. cit. Also table of U. S. cases in this article.

²This condition was termed galactoceles, by Vidal (de Cassis); chylous-hydrocele, by Busey; chylocele, by C. H. Mastin (senior); lymphocele, by Manson and others; milky-hydrocele, lymphous-hydrocele, filarial hydrocele, etc.

³Op. cit. p. 77-79.

⁴Filaria Sanguinis Hominis, etc., 1883, p. 12, note.

hydrocele (Hyrtl),—the conclusion is natural that the parasite occupies a positive causal relation to very many dropsical effusions associated with the testis and scrotum. This is still strengthened by the fact that, in five out of the eight recorded discoveries of the parent worm, the animal was found in the tissues of the cord, testis and scrotum. However, it is necessary to remark that in chylocele, as in chyluria, both a *parasitic* and *idiopathic* class or group, must be recognized, and the latter being possibly in excess over the former.

In an essay on the subject of chylocele, published in 1883¹, I assumed that the cases therein collected were due to an obstructive gonorrhœal lymphangitis of one or more of the glands into which empty the vasa afferentia of the cord, resulting in stasis, varicose dilatations,² thinning, and final rupture with leakage of lymph.

In none of these collected examples was there a parasitic history, although two of them were exposed to such a predisposing influence in point of climatic surroundings. In one of the other two instances, which came under my personal observation, the filaria was not discernible in either the blood or the chylous fluid, although carefully searched for, and hence the theory of *inflammatory* lymphatic obstruction maintained for them represented, doubtless, their real morbid condition.

It is probable, then, that some obstruction of the lymphatic vessels of the cord is always essential to the causation of chylocele; and in filarial cases it is believed that the ova of the parasite in question furnish the impeding or embolic masses. The explanation of the method by which obturation

¹Annals of Anatomy and Surgery, Brooklyn, May, 1883.

²Dr. C. H. Mastin (senior) was the first to demonstrate the existence of a lymphatic varix on the surface of the tunica vaginalis. In a case of chylocele, in April, 1875 (Amer. Med. Bi-Weekly, Louisville, Ky., vol. ii, no. 25, p. 617, June 19, 1875), he opened the sac by an incision of three inches, recognized a ruptured varix at the junction of the cord with the testis, and, after snipping it off, surrounded the base with a silk ligature. On the cut surface of the stump was seen the open orifices of several small vessels.

In a like case, in June, 1881 (Annals of Anat. and Surgery, May, 1883), I practiced the same procedure. The varix was similarly located, and when abscised showed the patulous mouth of a single vessel, from which exuded lymph. Both cases speedily recovered, and without reaccumulation.

is thus produced, may be regarded as identical with that considered by Manson to be the true pathology of elephantoid diseases.

In the life-history of the filaria it was shown that the fully formed or out-stretched embryos offered no impediment or retardation to the natural onward flow of the lymph, for, having a diameter¹ about that of the lymph cell, they penetrate without difficulty wherever these corpuscles passed; and, therefore, with them they freely traversed the minutest channels of the lymphatic glands and emerged into the blood. On the contrary, this is very different with the semi-spherical ovum, where the immaturely developed embryo is still coiled up in its enveloping sheath within the uterine tube of the parent, since in this ova-state its diameters² far exceed that of the fully formed embryo; and, consequently, when it is prematurely discharged into the lymphatic vessels it affords the required embolism, the current is interrupted or stopped, and lymph-stasis and regurgitation results. Thus, it is only needed for a prolific female, aborting or miscarrying from some, as yet inexplicable, cause, to expel her ova in numbers into the lymphatic circulation to produce plugging, more or less com-

¹Dr. Lewis states (Eighth Ann. Rep. San. Comm. with Govm't of India, 1871, Calcutta, 1872) that the average diameter of the embryo-filaria is "about that of a red corpuscle, and its average length about 46 times that of its greatest width; that is to say, its greatest transverse diameter is about $\frac{1}{3500}$ of an inch and its length $\frac{1}{75}$ of an inch;" but he has occasionally seen specimens not more than half this size.

Cobbold gives the measurement of the fully formed embryo as follows: Length, $\frac{1}{200}$ to $\frac{1}{125}$ of an inch; breadth, $\frac{1}{3000}$ to $\frac{1}{2250}$ of an inch (Parasites: etc., p. 181); and again (l. c. p. 189) says that the embryos sent by Bancroft measured $\frac{1}{125} \times \frac{1}{2500}$ of an inch.

Manson (China Imp. Customs Med. Rept. Half year ended March 31, 1882, 23rd issue) found the diameter of the out-stretched embryo to be only $\frac{1}{3000}$ of an inch, and again he says (Filaria Sanguinis Hominis, 1883, p. 7,) that the embryo measures $\frac{1}{90}$ inch in length by $\frac{1}{3500}$ inch in width.

²Dr. T. R. Lewis (Quain's Dic. Med. Art. Filaria Sanguinis Hominis, p. 513) says that the ova in which the embryos were not yet distinctly evident measured $\frac{1}{1304} \times \frac{1}{2000}$ of an inch; and that the ova in which the embryos were visible were $\frac{1}{666} \times \frac{1}{790}$ of an inch in size.

Cobbold (Parasites: etc., p. 181) believes that the eggs average $\frac{1}{1000} \times \frac{1}{1650}$ of an inch from pole to pole. Manson's measurements (China Imp. Customs Med. Rep; Half year ended 31st March, 1882, 23rd issue) for the ovum are $\frac{1}{750} \times \frac{1}{500}$ of an inch.

plete,¹ of the lymphatic glands receiving the lymph from a limited or extended area, according to the location of the worm.

Dr. Manson briefly states this theory of elephantoid diseases as follows: "1st, parent filaria in a distal lymphatic; 2nd, premature expulsion of ova; 3rd, embolism of lymphatic glands by ova; 4th, stasis of lymph; 5th, regurgitation of lymph and partial compensation by anastomoses; 6th, renewed or continued expulsim of ova; 7th, further embolism of gland."²

The most frequent location of the mature parasite in chylocele would seem to be in the lymphatics of the cord, since in two instances out of the eight recorded discoveries of the parent nematode, it was found free in the fluid of the sac,—in one of which four specimens were withdrawn with the effused lymph at a single tapping. Thus, evidently, in this affection the adult worm probably resides directly in the afferent lymphatics of the cord, or, if elsewhere situated, then these vessels share in the lymph stasis and regurgitation caused by gland obstruction at a more remote point above; and hence these lymphatics become dilated and expanded into varicosities that rupture and pour out filaria-bearing lymph into the vaginal tunic.

With this interpretation of the morbid processes existing in parasitic chylocele, the treatment becomes clear and positive.

A few cases are recorded of the treatment and cure of chylocele by iodine or other irritating injections, as usually employed in simple serous dropsy of the sac. But, while such a measure may prove effective in some instances, for very obvious reasons it cannot be relied upon, particularly in the parasitic variety, and should never be substituted for the certain and radical procedure of free incision into the tunica, and ligation of the ruptured and leaking varix. The efficiency

¹This obstruction may be so complete as to prevent the passage of a single embryo, thus explaining the absence of the filariæ in the blood when existing in numbers in the gland lymph and lymphous discharge.

²Additional Notes on *Filaria Sanguinis Hominis*, and *Filaria Disease*, China Imper. Customs Med. Rept. Half year ended 31st March, 1882, 23rd issue. p. 13.

of this method is demonstrated by its successful application in two cases, to which I have already alluded; and this, together with the constant existence of an oozing lymph-varix, and the probable presence of the mature filaria in the superficial tissues of the cord, or, perhaps, free in the fluid of the sac, furnish all the necessary argument in favor of its general adoption.

In recapitulation it can be assumed, that the *filaria sanguinis hominis* represents the pathological quantity in many forms of lymphatic diseases, and mainly those implicating the genito-urinary apparatus; that the nematode not only occurs in, but is, undoubtedly, indigenous to some portions of the United States, especially the South Atlantic and Gulf Coasts; and that all methods adapted to the treatment of the parasite upon general grounds are confined to preventive or prophylactic measures, which, in the present state of our knowledge, refer exclusively to the potable water supply—and this being resolved into the single and simple procedure of the perfect filtration of all cistern or uncovered water, or any drinking water whatever, to which the access of filarious mosquitoes is possible.

Note.—For the benefit of those interested in the history of *filaria sanguinis hominis*, and the pathological conditions ascribed to the presence of this nematoid hæmatozoon, I append a rather voluminous bibliography of the subject. A large portion of the works therein referred to have been examined personally by me. In its preparation I must acknowledge especial aid from that grand compilation, the Index Catalogue of the Library of the Surgeon General's Office, U. S. Army, and the elaborate publications of T. Spencer Cobbold, of London.

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LIGATURE OF SUBCLAVIAN ARTERY FOR AXILLARY ANEURISM.

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ROBERT L., æt. 49 years, was admitted under my care into the Manchester Royal Infirmary on December 8, 1887.

HISTORY.—Twenty years ago he had syphilis with secondary symptoms. He had always worked as a joiner. His health appears to have been good until last June, when he noticed a "nagging" pain in the right axilla, at its lower part, after his day's work was over. The pain was intermittent and did not prevent his working. About a month later he noticed a swelling which slowly increased until three weeks ago; since that time its progress has been more rapid. There has never been any swelling of the arm. He ceased working eight weeks ago.

CONDITION ON ADMISSION.—The patient is a tall large-framed man, somewhat spare but not unhealthy looking. There is a large tumor to be seen and felt in front of the axilla on the right side; the swelling is about the size of a cocoanut, and reaches from the floor of the axilla to the clavicle, and can be also felt in the posterior triangle projecting upwards behind the clavicle; there is a space of a clear inch or more between the swelling and the posterior border of the sterno-mastoid. Pulsation is well marked and expansile; there is no distinct bruit. On light pressure over the third part of the subclavian

artery a distinct thrill is felt. Any attempt at firm compression of the vessel is very painful, and checks pulsation very little; neither does it appreciably alter the size of the aneurism. The right radial pulse is perhaps slightly weaker than the left. There is pain in the lower part of the tumor as well as over the external surface of the arm, and the middle, ring, and little fingers. Pulsation in the left subclavian is very distinct. His arteries are markedly rigid. On examination by Dr. Reynolds, our resident medical officer, he reports "The cardiac apex beat is in the fifth space slightly external to the nipple line, there is no thrill, there is slightly increase of the deep cardiac apex dulness. The dull area over the upper third of the sternum is slightly increased on each side almost as far as the costo-chondral margin, beyond this the percussion note is normal. Over the whole cardiac region there is a loud to and fro murmur every where of the same quality, it is most marked at the second right costal cartilage. A similar murmur is heard over the carotid, the sounds in the left carotid are normal." Dr. Reynolds is of the opinion that there is dilatation of the aorta with consequent incompetence of the valves. The man's pupils are both much contracted and equally so; this appears to be a condition of long standing, his sight has been weak as long as he can remember; the pupils do not react to reflex stimulation, and the palpebral fissures both seem to be contracted. No patellar reflex can be obtained, there is no ankle clonus; the man says he is more unsteady in the dark than he used to be. Urine, sp: gr. 1018, acid, no albumen or sugar.

The patient was kept in bed and given 20 grain doses of iodide of potassium three times daily with $\frac{1}{4}$ gr. of morphia at night, and $\frac{1}{6}$ in the morning, to relieve his pain. On Dec. 12, the aneurism was distinctly larger than it was on admission, and the pulsation was much more forcible. On the 11th, the girth round the axilla was $19\frac{1}{2}$ inches as compared with 19 inches on the 12th, and the pulsation was still more forcible. The arm had been bandaged to the side, but as this increased the pain the patient released it. Ligature of the third part of the subclavian was arranged for the next day. On the night of the 13th the man was delirious.

December 14. The patient was brought into the theatre anæsthetized, and a 5 inch incision was made in the usual way, one or two subcutaneous vessels were divided, the external jugular vein was hardly seen and was not in the way, the omohyoid was exposed and drawn upward, the lower cord of the brachial plexus was then taken as the guide, and the artery was tied with a chromic gut ligature (No. 4), with very little disturbance of the surrounding structures. The scalenus anticus was not found to be a very good guide, inasmuch as the tense fascia stretching from its posterior border to the sheath of the artery obscured the line of the muscle and as the artery although deeply placed rose fairly high in the neck, the scalene tubercle was not of any value as a steering point either. The needle was passed from without inward, the subclavian vein was not seen, the suprascapular vein was just seen lying behind the clavicle, but was not in the way, no other vessels of any size were exposed. On tightening the ligature the aneurism at once collapsed, and pulsation in it and at the wrist ceased. The wound was powdered with iodoform and boric acid, (equal parts) and closed except for a rubber drainage tube, the spray was used and a wood-wool dressing applied, the whole limb was wrapped in wool and the patient removed to bed. I had the advantage of the kind assistance of Mr. Thomas Jones during the operation.

The subsequent history of the patient, as far as the aneurism goes was absolutely uneventful, the limb was never cold, there was practically no pain, the aneurism remained collapsed, and no pulsation returned in the arm. Morphia was given freely to keep the man quiet, as the delirium which appears before the operation continued and got worse at night. He remained in this state till the 16th, when he was so violent and restless that he had to be strapped down, while chloral and bromide mixture was substituted for the morphia, but with no better result. On the 17th his general condition was poor, the tongue was getting dry and his strength failing, temperature 98° , he was ordered \mathfrak{zvi} of brandy and a dose of the chloral and bromide every two hours until he slept. 18th. General condition poor, he seems to be failing, pulse in the left wrist weak and irregular, tongue dry and rough, tempera-

ture 97.6° . He slept all night and takes a good quantity of milk; there is diarrhœa, He was ordered fish, chicken and all the nourishment he could take. The wound was dressed for the first time, it was all healed except the drainage opening; the tube was removed, the aneurism was nearly completely collapsed and there was no pulsation, some firm clot could be felt in the sac. The chloral was stopped.

December 20. Patient was very restless all day yesterday, the diarrhœa has ceased to-day. In addition to his six ounces of brandy, he is taking six ounces of brandy mixture, and an ammonia mixture. His temperature which had been sub-normal since the 18th, remained as low as 97° throughout the 20th. The pulse (in left radial) was very irregular.

December 21. He had a much quieter night, takes a fair amount of nourishment, the temperature is still subnormal and the pulse very weak and irregular, there are at times twitchings of the first and second fingers of the left hand. Delirium with various delusions has lasted all the time since the night before the operation. On the 24th the temperature rose to 99.4° but again fluctuated, not being normal till January 3, 1888. The general condition steadily improved, but his mental state was most unsatisfactory; he was quiet but had delusions; this was, however, improving on his discharge January 18. At this time the aneurism was perfectly well.

This case has been given in considerable detail, since it presents many points of interest. The aneurism was large, and rapidly increasing, its walls were thin and it contained apparently very little clot, there was general arterial degeneration with a dilated aorta, considerable evidence of locomotor ataxy, and the night before operation, delirium. Under these very unfavorable conditions was ligature the best treatment? Pressure was impossible; medical and dietetic treatment obviously insufficient. Amputation, the old operation, the introduction of wire, etc., into the sac, and manipulations, electrolysis, etc., were all rejected, though consent was obtained for amputation should it become necessary at the time of the operation in consequence of any casualty. Amputation was considered to be out of the question, first because the disease extended to behind the clavicle and the vessel would have had to be

ligatured in the posterior triangle as well ; and secondly, because it was thought to be an unnecessarily severe measure. The extent of the sac precluded the use of the old operation, and the results of the other methods are not sufficiently encouraging to lead me to apply them where ligature is possible. Happily the artery at the seat of ligature was apparently fairly sound, and the operation being aseptic no wound complication was introduced. The next anxiety, gangrene, never threatened. The mental condition appeared probably due to brain lesions, the result of his damaged vessels ; it was clearly not due to the operation, to the anæsthetic or the iodoform, since it began before the operation. The low temperature and weak and irregular pulse were, I thought, best explained by supposing that some clotting took place in the dilated aortic arch, and this, perhaps, also contributed to the brain disturbance. The correctness of this opinion was shown by the autopsy. The great prostration caused much anxiety, and I feared that there was too much general visceral degeneration to allow him to recover, though the quality of his urine was fairly good.

The operation itself was, I should say, a moderately easy one ; the clavicle did not come down well, and the vessel lay deep, but there were no important overlying veins, and the arch rose pretty high above the rib.

It is worth noting that the course of the third part of the subclavian is vertical when it rises high in the neck, and horizontal when this is not so, so that the needle in the one case is passed from without inward, (or vice versa), and in the other from below upward, (or vice versa). As pointed out to me by Professor Young when I was examining some bodies before operation, the artery is most readily reached by taking the lower cord of the brachial plexus as a guide, and sometimes the cord will be found quite overlying the artery. This is a much better method than the old one of taking the scalenus ; at least, so I have found it.

The association of syphilis, locomotor ataxy, aneurism and hard work, (he did much planing) is well seen in this case.

I am indebted to Dr. Reynolds and Mr. Bannister (house sur-

geon), as well as to Mr. T. Porter for help in recording the case.

After his return home, the man improved and his mental condition became natural, but in little more than a week he began to complain of pain in the chest. The pain increased, and became very severe, and he died February 12, death being due to the aortic disease. The axillary aneurism gave rise to no trouble.

The man's home was 20 miles away, but I obtained leave for a post mortem ; this, however, was limited to removal of the heart and the parts connected with the aneurism. The heart was large, mitral and tricuspid valves both thickened, but not otherwise markedly abnormal. The aorta was dilated and about twice its size in the ascending and transverse parts of the arch. The pulmonary artery was much dilated. The heart tissue was fairly good. As had been suspected, there was a large firm clot occupying nearly half the calibre of the aorta, and reaching from close above the valves to the orifice of the left carotid artery. The aneurismal sac measured three inches by one and a half inches, it was filled with clot, which was firm and laminated at the periphery, but somewhat soft and loose in the centre. At the lowest point of the aneurism was a small secondary sac as it were, as if another small aneurism was grafted on to the large one. The artery was completely occluded from the origin of the thyroid axis to the aneurism, a distance of about an inch. In the neighborhood of the ligature, the knot of which remained, was a cavity about the size of a large cobnut, which contained broken down blood. The cords of the brachial plexus were firmly adherent to the sac of the aneurism.

The operation may thus be considered to have been entirely successful as far as the cure of the aneurism goes. but what share it took in causing the aortic clot is doubtful. Unless the artery had been tied, it seems probable that the aneurism would have speedily ruptured, since its growth was very rapid just before the operation.

A CASE OF EXCISION OF THE TONGUE, FOLLOWED BY DEATH FROM ACUTE MILIARY TUBERCULOSIS.¹

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PROFESSOR OF ANATOMY IN M'GILL UNIVERSITY; SURGEON TO THE MONTREAL GENERAL HOSPITAL.

A STRONG healthy, looking Irishman, A. W., æt. 64, entered the Montreal Hospital May 19, 1888, suffering from an ulcer of the tongue. Last September, first noticed a small hard nodule on the left side of the tongue, about one inch from the tip and opposite a sharp decayed tooth. The growth annoyed him greatly, and he consulted a medical man who cauterized it. An ulcer soon formed which increased slowly. Last March another lump appeared nearer the tip of the tongue which also ulcerated. The ulcer was painful from the first. Patient has never been ill in his life, never had any cough. Has been a moderate smoker. Family history negative.

His condition on entering hospital was as follows: "Small, spare, active man of considerable vigor, is 64 years of age but looks younger. On the left side of the tongue, commencing about half an inch from the tip, is an irregular fissured ulcer divided into two parts by a nodule of induration; the edges of the ulcer are ragged, and the base sloughy; the base is indurated, and the ulcer is surrounded by a mass of induration the size of an almond. There is considerable pain, and the patient is unable to masticate his food on the affected side; there is not much salivation and no fœtor, and but little interference with articulation. On examining the submaxillary region some small hard glands are felt, which are quite movable. Examination of the various organs revealed no evidence of disease. Temperature, pulse, and respirations normal." A portion of the growth was snipped off and examined microscopically, but nothing but epithelial elements found.

On consultation with my colleagues taking into consideration the history of the case, the age of the patient, the appearance of the ulcer with its indurated base and the involvement of the sub-maxillary lym-

¹Read before the Montreal Medico-Chirurgical Society, June 22, 1888.

phatic glands, it was thought that the case was one of epithelioma and demanded immediate operation.

On May 23 I performed my usual operation for removal of the tongue, viz., preliminary ligature of the linguals and removal of the enlarged glands by the same incision and excision of the tongue by scissors. On examining the state of the glands through the submental incision, more were found to be involved than could be made out by external manipulation. They with the submaxillary glands were removed.

Large drains were introduced into the mouth through the neck incision, and the wound packed with Billroth's sticky iodoform gauze. This not remaining in more than a few hours, the wound was painted over with a paint of iodoform, resin, castor oil and alcohol, which formed a good antiseptic coating for the surface of the wound.

The patient recovered well from the operation. He was fed by the rectum for three days; on the fourth day he sat up in bed and fed himself with a tube; that evening he complained of a pain in the right side, and his temperature rose to 101° . Next day a well marked friction sound was heard. The wound was doing well, and the very slight fetor emanating from it was dissipated by a wash of Condly's fluid. On the sixth day his temperature was 103° , and respiration 41. He became very weak and rapidly sank, and died the next day.

Dr. Lafleur who performed the autopsy has kindly given me the following report:

"External wound in neck healthy and granulating, wound in mouth perfectly healthy without fetor and apparently healing kindly. In thorax was found a complete adhesive pleuritis of right side; adhesions are recent tearing easily. Similar recent adhesions over upper two-thirds of left lung. Surface of both lungs covered with numerous miliary tubercles. On section, right lung from base to apex is crammed with gray miliary tubercles the size of millet seeds. Left lung on section also contains numerous miliary tubercles scattered throughout the upper two-thirds. In both lungs the tissue between the tubercles is intensely congested. No caseating bronchial glands found; bronchi normal in appearance; liver and kidneys contain a few miliary tubercles. Pelvic organs normal; epididymis of right testicle is enlarged and on section found to be entirely caseous: vas deferens thickened, body of testis appears normal. Left testicle and appendages normal."

"A microscopic examination of the growth on the tongue showed numerous tubercles in floor of ulcer, and around them abundant small

celled infiltration. Tubercles also found among the muscle fibres. Under high power numerous giant cells visible. The glands showed only a condition of inflammatory infiltration."

There is now no doubt in my mind that the case was one of tuberculous ulcer of the tongue with perhaps a latent condition of general tuberculosis which was lighted up into activity by the operation. The case is a unique one in my experience, and I do not see how one could have avoided the diagnosis of cancer. An intractable ulcer of the tongue with indurated base accompanied by enlarged sub-maxillary lymphatic glands occurring in an old man of 64, would naturally be looked upon as of a carcinomatous character by most surgeons. The diagnosis between tuberculous and cancerous ulcer of the tongue is always a difficult one, for the lymphatic glands are involved in both diseases. Tuberculous ulcers have frequently been excised on the assumption that they were cancerous. In both diseases the same parts of the tongue are affected, the lymphatic glands involved and both may have their origin in injury, or, as in the present case irritation. The diagnosis of tuberculous ulcer is still more difficult when no other signs of tubercle are present, and when the disease occurs at an advanced age. Excision of tuberculous ulcers is now a recognized method of treatment, and is one that offers the best chance of cure, especially when the disease is primary.

The present case is interesting from the fact that there was not the slightest reason to suppose that the patient was predisposed to tubercle. The family history was good. His temperature, which was carefully taken for several days before operation, was perfectly normal. This joined with the fact that the tubercles were all of the same age, makes it probable that the general tuberculosis did not exist previous to the operation. Whether the man was in a condition ripe for tuberculosis and the operation was the exciting cause, or whether he became infected through the blood in consequence of the large wound it would be difficulty to say. No doubt the infection came through the focus in the tongue and not that in the testicle. Cases of miliary tuberculosis occurring after operation are not common; still they occur, but usually after an interval

of some weeks. Tuberculosis is well known to occur after fevers, such as typhoid, probably in such a lowered state of the system, the resisting powers of the individual are lessened, The rapid development of the tubercle in the case under discussion is remarkable, and death was no doubt immediately due to the extensive pleuritis.

As far as the operation is concerned, everything went well, and there was no post-mortem evidence that the patient died of any of the forms of septicæmia which follow excision of the tongue.

At one time it was thought that the ulcer might have been a cancerous one existing in a tuberculous subject, but a careful microscopic examination of the tongue and glands failed to show any evidence of carcinoma, while, on the other hand distinct evidence of tubercle was present.

CASE OF STRANGULATED HERNIA; OPERATION FOLLOWED BY LAPAROTOMY FOR INTES- TINAL OBSTRUCTION.

By ARCHIBALD DIXON, M.D.,

OF HENDERSON, KY.

JOHN CARROLL, saloon keeper, æt. 46, three years ago applied for and was granted a pension upon the following grounds. Left inguinal hernia, oblique; varicose veins of both legs, and heart disease. The hernia was said to have been caused by a strain received in lifting a forage wagon out of a rut during the war, the heart having been weakened at the same time, the varicose veins appearing later. Examination revealed a left oblique inguinal hernia, easily reducible, heart sounds normal, though lacking in force, both legs disfigured by varicose veins but no ulceration. The applicant was advised to apply to the Government for a suitable truss, and to wear it constantly. He did apply for and received a truss, but only wore it for about a week, as it gave him some

discomfort. On May 14, 1888, he rode from Henderson, Ky., to the neighboring town of Dixon, a distance of 30 miles, in an open buggy and over a rough road. The night of the 14th he was attacked with colicky pains which were partially relieved by a hypodermic of morphia and atropia. May 15, he made the journey back to Henderson in the same conveyance and over the same road, arriving at home about 9 P. M. The pains had continued with slight intermission and growing gradually more severe and accompanied by vomiting, notwithstanding a liberal supply of morphine. On the morning of the 16th, I was called to see the patient, and found him with anxious countenance, weak pulse, a disposition to vomit frequently, and obstinate constipation. An examination of the hernial orifices was immediately made, and the hernia spoken of found to be strangulated, the bubonocoele formed by it being tender and swollen; all attempts at reduction proved futile. Taxis was made under chloroform without avail, and the patient was informed that an operation was necessary for his relief. This was readily consented to by the patient, but strongly objected to by his wife, consent being withheld until she could consult with her family and friends. On the morning of the 17th, the patient's condition was much worse, he having passed the night in pain and almost incessant vomiting, his wife having administered to him against my advice, three compound cathartic pills in order to relieve the constipation, this being followed by several large enemata of soapsuds. This treatment but added to the gravity of the case, and urged by myself and three other physicians, a reluctant consent was given to operation. The patient was accordingly placed upon the operating table, the pubes and abdomen were shaved and the parts rendered as perfectly aseptic as was possible by scrubbing and by the use of antiseptics. Assisted by Dr. John Young Brown, the usual operation was made for the relief of strangulated hernia; the sac was opened and a knuckle of gut was found in the canal deeply congested, surrounded by a large mass of adhering omentum. The point of strangulation was at the neck of the sac which was incised freely. In attempting reposition of the gut, it was found adherent to the sac. The adhesions were carefully separated, except at one

point where it was deemed best to excise the portion of the sac attached to the gut and return them together. The omentum was liberated, drawn forward and after deligation with strong catgut was cut off and the stump returned to the abdominal cavity. The sac was closed with catgut, and Czerny's inguinal suture was used in closing the ring; a drainage tube was placed and the external opening closed by silk, the whole being covered by an antiseptic dressing. The patient came from under the anæsthetic well, but vomiting still persisted and he complained of great thirst, temperature 99° pulse 105. Tepid water was given by enema, which greatly relieved thirst. Iced lime-water and champagne in addition to hypodermic of one-third of a grain morphia and one one-hundredth of a grain of atropia were given, but without any permanent relief. Constipation remained obstinate, and there was no passage of gas from the bowel. Patient passed a restless night, and his condition on the morning of the 18th, presented every indication of intestinal obstruction. There were symptoms of collapse, but not marked: pain was severe though intermittent, and was sharply defined over the umbilical region; vomiting was persistent, the vomited matter for the first time being feculent, and there was marked diminution in the quantity of urine passed, temperature 99° , pulse 110. Evidently the operation for the relief of the strangulated gut had failed of its object; there was either paralysis of the released loop or obstruction within the abdominal cavity existed. "There is, I think, a fairly common impression that when a strangulated hernia has been reduced and the patient has recovered from the operation, no further evils will result beyond a possible return of the hernia, and with it a risk of a second strangulation. A piece of bowel, however, that has been strangulated in an external hernia and has been reduced into the abdomen, may be the cause of one of the many forms of intestinal obstruction. I do not allude to results immediately following the reduction of the hernia, but to results that are comparatively remote. Among the former, as is well known, it is not infrequent for the once strangulated loop to remain so entirely paralyzed after reduction as to continue the symptoms of obstruction until death ensues, and that too, without either becoming gan-

grenous or causing peritonitis!"¹ The question to be decided was whether the symptoms of obstruction which persisted after the release of the strangulated gut were due to paralysis of the loop, or was there still an obstruction which had not been relieved by the operation? Drs. S. G. Smith, P. H. Griffin, and John Young Brown were called in consultation, and after due consideration it was decided to make an exploratory laparotomy, and should there be further obstruction from whatever cause to relieve it if possible. Before, however, proceeding to this extreme measure I suggested to Dr. Brown to whom I had been relating the experiments of Dr. Senn with the rectal insufflation of hydrogen gas in the diagnosis of visceral injuries, which I had seen performed at the meeting of the American Medical Association at Cincinnati a few days before that perhaps, by the use of the gas, as directed to be used by Dr. Senn, a positive conclusion might be arrived at as to whether strangulation still existed, or whether the symptoms were due to paralysis of the loop of gut which had been strangulated in the hernia, and which had been released. He readily saw the importance of the suggestion, for in the event strangulation of any part of the intestine existed, it would be impossible to force the gas beyond the point of obstruction by any pressure which would be within the line of safety. On the other hand, should the symptoms of obstruction be due to paralysis, following and consequent upon the previous strangulation, there would be no special difficulty in forcing the gas through the entire intestinal tract, and by the use of a stomach tube, demonstrating beyond the shadow of a doubt the patency of the canal. The gas was at once prepared and passed into a rubber bag with a stop-cock which I formerly used in the treatment of phthisis by Bergeon's method. The bag held three gallons. (By the way, any one having an apparatus which was formerly used for the generation and injection of carbonic acid gas by the once vaunted Bergeon's method, will find it to answer an admirable purpose for the generation and insufflation of hydrogen gas.) A small piece of rubber tubing was passed over the nozzle of the gas bag and in-

¹Intestinal Obstruction. Treves.

to the other end an ordinary hard rubber rectal tube was forced. The tube was inserted into the rectum, and assisted by Dr. Brown the insufflation was begun, the gas being forced out by very gentle pressure. In what seemed a remarkably short time, the peculiar gurgling sound caused by the gas passing the ileo-cæcal valve could be distinctly heard, but only a small quantity had passed through the valve when further ingress of the gas was stopped, the patient at the same time complaining of great pain. The lower part of the abdomen which was slightly tympanitic, became tense and hard with exaggerated tympanites. As much pressure as was thought to be consistent with safety was used, but the gas could not be forced higher up. There could no longer be any doubt that obstruction of some portion of the gut beyond the cæcal valve, most probably of the ileum existed.

The condition of the patient was explained to him, also to his wife and family, and the advisability of immediate operation laid before them. The statement was made to them that without operative relief, death was inevitable, that with it, there was a possible chance for recovery. Mr. C. expressed not only a willingness but was anxious that the operation be done. Again a reluctant consent was given by the wife and family. As soon as the necessary preparations could be made, the patient was again placed upon the operating table. The entire abdomen was shaved, scrubbed and disinfected. Hands, instruments and sponges were scrupulously cleansed and disinfected; the body and extremities were protected from exposure by warm flannels. The incision was made from the umbilicus to the pubes. There can be no question as to the advantage of an incision sufficiently large, not only to insert the hand of the surgeon, but also to inspect the contents of the abdominal cavity. Immediately upon opening the peritoneum, a coil of distended small intestine protruded and was received upon and covered with towels, wrung out in hot bi-chloride solution, by Dr. Brown. Search was at once made for the obstruction, by passing my hand into the abdominal cavity and, following the directions laid down by Treves, the cæcal region was looked after first. This part of the intestine was only moderately distended (the distention, I took it, being

largely due to the hydrogen gas, much of which had, however, escaped from the bowel, per anum.) Passing the hand across to the region of the sigmoid flexure, several large glands—mesenteric—could be felt; the colon was closely attached by adhesions to the abdominal wall. Just within the fold of the sigmoid flexure, a large gland could be felt, and the gut, at this point, was firmly fixed; its lumen was considerably narrowed by the pressure of the gland. The superincumbent coils of intestine were gently pushed aside, and the part brought into view, exposing a loop of ileum much congested, about the size of a duck egg, which had slipped under, and was strangulated by, a band which extended from the site of the gland in the fold of the sigmoid flexure to the edge of the inguinal ring. The gland was caseous and evidently tubercular; in fact, the entire mesentery was studded with tubercular glands from the size of a millet seed to that of a walnut. This band was ligated at both ends of its attachment and divided. The sides of the loop of ileum, which was slightly twisted, were agglutinated so closely that it required very careful manipulation to separate them; the adhesion, however, was recent. A further and careful search was made for other points of obstruction, but none were found. The knuckle of gut which had been strangulated within the inguinal canal, was no longer congested, and looked to be normal. The toilet of the peritoneum was made with great care; warm water, which had been boiled, was used for irrigating the cavity; the protruding intestine was returned without difficulty. The wound was closed and dressed after Gerster's method.¹

As before, the patient came from under the anæsthetic well and, after the administration, hypodermically, of morphia one third grain and atropia one one-hundred-and-fiftieth of a grain, slept for three hours. Shortly after waking, vomiting again occurred and continued with slight intermissions, notwithstanding the most strenuous efforts to overcome it. Pain was not again complained of; the distention gradually diminished, there being frequent passages of gas from the lower bowel,

¹Aseptic and Antiseptic Surgery, Gerster.

accompanied 36 hours after operation by fæcal discharge; the pulse grew weaker and weaker, temperature never having reached above 100° F. and on the day death took place was sub-normal, 96.5° . The patient died fifty-two hours after the last operation, seemingly from exhaustion.

This case certainly presents many points of exceeding interest. There cannot, I think, be any question of the correctness of the diagnosis of strangulated hernia. The constriction at the neck of the sac, and the intense congestion of the inclosed gut proved beyond a doubt the existence of strangulation. The coincidence of internal strangulation of a loop of intestine by a band, accompanying a hernial strangulation, is certainly a rare and unusual occurrence, and this point was freely discussed, as were all others, by the physicians who saw the case. My own conclusion was, that a local peritonitis had existed in the vicinity of the mesenteric gland and, from this, a band had developed and had become adherent at the points mentioned. "The little local peritonitis excited in the serous membrane covering the glands, may lead to the adhesion of a free diverticulum, or may encourage the development of bands which may, in turn, prove a cause of intestinal strangulation." Under this band, a loop of intestine had slipped, either prior to, or during the strangulation of the hernia, the probabilities are that it was already beneath the band before strangulation took place in the hernia. The distention of the gut, consequent upon this strangulation, doubtless extended to the loop beneath the band, which became, in turn, distended. Inordinate activity of the peristaltic movements was produced by the congestion which necessarily followed the constriction and which was intensified by the administration of the cathartic and, it is probable that these violent movements materially aided in producing the strangulation.

The experiments made by M. Anger, and quoted by Treves, show conclusively how this may be brought about. "M. Anger, experimenting in another direction, drew a loop of gut out of the abdomen and put a ligature lightly around its two ends. The ligature was loose enough to allow the gut to slide about within it, and to allow the tip of the little finger to be introduced into each end of the bowel. He then made a hole at

the bend of the loop at the part most remote from the ligature, and introduced a tube through which air was blown. As the gut distended, some air escaped but the more swollen it became, the more tightly it was gripped, until when fully distended, it was found to be hermetically sealed; and, what is more interesting, *more gut had been drawn into the loop from the abdomen.*¹"

It may be that the final cause of the strangulation, was the twisting of the involved loop, which was probably brought about, partly, by the distention and partly by his own movements, assisted by the dragging of the mesentery.

The question of enlarging the hernial opening or of making a median incision, was discussed, and was decided in favor of the latter and, I think, rightly. "In answer to this question it may be said that in all cases it is better for the incision to be made in the middle line, and this applies as well to exploratory as to curative procedures. The incision made in the linea alba is a simple one; no important structures are cut through; no vessels of any magnitude are divided; the abdominal cavity is easily reached; the wound is not a deep one, and after the operation its edges can be easily approximated. If the incision be made over the supposed seat of obstruction, it is probable that the abdominal muscles will have to be cut through; important planes of connective tissue will thus have to be opened up; vessels that may cause troublesome bleeding are apt to be divided; by the time the abdomen is opened the wound will be a deep one and will have to be relatively larger than the median wound, in order to obtain an equally extensive display of the interior of the belly. Moreover, wounds through muscular layers are not so easy to adjust, and in the case of the abdomen are more likely to lead to hernia than is a median wound through a dense fibrous structure.

Even in cases where the obstruction is supposed to depend upon some morbid condition in the loop of gut reduced from an external hernia, it is better, as a rule, to make the cut in the middle line than over the seat of the hernia. A cut into the abdomen through the region of the inguinal canal is apt to

¹Intestinal Obstruction, Treves.

seriously weaken a part already weak, and render very probable a subsequent ventral hernia. It, moreover, greatly limits the surgeon's sphere of action, and may render the operation useless should an error have been made in the diagnosis. Thus in cases supposed to depend upon an external hernia, an incision has been made over the sac; nothing has been found of note, the wound has been closed, and a second cut made in the linea alba. Through a median incision made between the umbilicus and the pubes, all parts of the abdomen can be reached, and all parts of the intestine explored. If the obstruction is not in the situation in which it was expected to be found, it may be searched for elsewhere."¹ For these reasons and others, I decided to make the median incision. No attempt was made to prevent the protrusion of the intestines when the abdomen was opened, for by it more space was gained for discovering and treating the cause of the obstruction, and because I did not believe that the case would be prejudiced by the extrusion of bowel if properly protected in the manner described. "The plan of permitting bowels to protrude has been very generally and very heartily condemned. The condemnation, however, has been in the spirit of the peritoneal surgery of the last generation, rather than of the present. In the face of the actual practical work now successfully carried out, it is idle to argue that extrusion of the bowel properly managed is a source of serious danger. Less damage is likely to be inflicted on bowels by a soft sponge or sponge cloths lightly resting on them, than by a rough hand pushing them about, under great pressure inside the abdomen."²

The rectal insufflation of hydrogen gas, in cases of suspected intestinal obstruction, I regard as a diagnostic procedure of great value. If the gut is clear, there will be no difficulty in forcing the gas through the entire large and small bowel into the stomach, where its presence is soon made known by eructations, and to make assurance doubly sure, a tube can be passed through the œsophagus into the stomach. If there be gas present, it will at once escape and, by touching a lighted

¹Intestinal Obstruction, Treves.

²Abdominal Surgery, Greig Smith, 2d ed.

match to the end of tube, it will ignite. Nothing short of complete strangulation will prevent the passage of the gas. Thus in cases of fecal impaction, the symptoms of which so often resemble obstructions of graver character, the gas could be forced by and around the impaction, affording unmistakable evidence that strangulation did not exist. If the gas could not be made to traverse the entire intestinal tract, distention of the abdomen, with exaggerated tympanites, over a given space would, as undoubtedly, show that obstruction did exist.

A CASE OF SPLENECTOMY FOR LEUCÆMIC ENLARGEMENT.

By ROSWELL PARK, A.M., M.D.

OF BUFFALO.

PROFESSOR OF SURGERY IN THE MEDICAL DEPARTMENT OF THE UNIVERSITY OF
BUFFALO.

MICHAEL Hamerlein, æt. 47 years, was sent to me by Dr. Pettit in September, 1886, was born in Germany, and does not remember anything about his parents, but is sure they did not die of tumors, nor of any malignant disease. He had typhoid fever when 16 years of age; served three years during our war. In 1865 was wounded in the right leg, but made complete recovery. While in the service was sick for some time with chronic diarrhœa, and was "moonblind" for two weeks at one time. During May and June, of 1886, he had chills and fever; during July was in a hospital at Erie, Pa., where his enlarged spleen was for the first time detected. He says he has been sickly for six years, but complained of nothing definite. Present condition, anemic and cachetic, has a sallow appearance, complains only of slight headache, extreme weakness, shortness of breath and of the swelling of his feet and legs when he walks much; says that six months ago he had intense abdominal pain which soon subsided. His pulse is fair in volume but slightly irregular; on palpation,

he presents a large tumor in the left side of the abdomen, which reaches to the height of the sixth rib in the axillary line and to the crest of the ileum below, at a level of three inches above the navel it extends an inch and a half to the right of the middle line; opposite the navel is quite a notch and then two inches below, it again extends an inch and a half over to the right of the middle line, thence downward to within two inches of the pubes. Posteriorly, it can be traced to within three inches of the spine; its free border can be plainly felt through the abdominal walls. The glands in both groins are slightly enlarged, but neither the thyroid, cervical nor axillary. The bowels move daily, his appetite is poor. His general condition led me to make careful estimate of the relative number of white corpuscles in his blood; the proportion was found to be one 1 to 50 or 60. Estimation of urea gave a total excretion of 20 to 21 grams in 24 hours.

The patient was in a pitiable condition, and while there was no doubt as to the diagnosis of leucocythæmia with the most pronounced lesion of the spleen, still the proportion of white corpuscles to the red did not seem to be so overwhelming as in a large majority of case where the spleen is so prominently affected. The man suffered constantly, realizing his impending fate, and implored me to take any measure that offered the slightest prospect of relief. The question of extirpation of the spleen, thus brought up by his own request, I canvassed carefully in my own mind, well aware of the fatality attending its removal under such conditions. I yet felt that the predominance of white corpuscles was not so conspicuous as to make the operation necessarily and absolutely unjustifiable. I, accordingly, discussed it with him at some length, and told him I thought he had about one chance of life out of five. This chance he gladly accepted, and on this distinct understanding, he was prepared for operation.

The operation was made Sept. 29, in my clinic at the Buffalo General Hospital, in the presence of the hospital staff, numerous invited spectators and the clinical class. Prof. Mann kindly assisted me. Chloroform with nitrite of amyl was the anæsthetic, which he took kindly. The incision was made in Langenbuch's line, along the outer margin of the left rectus.

It was some eight inches in length and gave ready access to the spleen. The splenic capsule was found very adherent to the parietal peritoneum; these adhesions I severed as rapidly as I could, and with but little loss of blood. Then slipping the free or hepatic end of the tumor out of the incision, I tried to lift it out. The mass was so soft that it threatened to part under this strain. Accordingly, I had to pass my hand up under it toward the diaphragm, where I found its suspensory ligament both strong and inaccessible; finally, by trying to clamp its apparent pedicle at the hilum, I by force lifted it out of the abdomen. Instantly after its removal, it was found that nearly all of its vessels were ruptured, and its site filled with blood, mainly venous; it took considerable time to sponge it out fast enough so that I could see the source of the hæmorrhage. Most of this was found to come from the diaphragm, and it was very hard work to seize with long forceps the bleeding vessels and secure them. Several times I had to resort to the ligature *en masse*: even then there was a great deal of venous oozing which I finally stopped with Monsell's salt. The other sources of hemorrhage gave very much less trouble. Finally, everything was made apparently secure, and I closed the opening with sixteen silver sutures. Hypodermics of brandy were freely given, although at no time was the patient completely collapsed before he rallied from the anæsthetic. The total time occupied was just one hour; he rallied pretty well and conversed with me, complaining of severe pain; his pulse improved up to the time when I left the building. A few hours after the operation he went into a sudden collapse and died.

An autopsy was made on the following day, which was not complete, but was directed especially to ascertaining the results of the operation. I was pleased to find that the oozing had been insignificant, that no ligature had given way and that the hemorrhage seemed to have been mastered. There were none of the ordinary glandular evidences of leucocythæmia. Aside from this, no further examination was made. The spleen weighed, after removal and emptying of considerable of its blood, just nine pounds.

I was prepared for a difficult and trying operative ordeal,

fearing hemorrhage more than anything else, and expecting to find the largest vessels to be enlargement of the normal vessels supplying the region. I was surprised, therefore, when I found the large number of adventitious vessels entering through the suspensory ligament. Opportunity was not offered for discovering exactly what the vascular arrangement was, but the normal vessels entering from the diaphragm through this peritoneal fold must have been enormously dilated. I had but little expectation of success, and should not have consented to operate except at the earnest solicitation of the patient, as mentioned.

I submit the report of the case without further remark, simply as a contribution to the statistics of splenectomy.

NOTE ON ELECTROLYSIS OF UTERINE FIBROMA.

By A. P. PECK, M.A., M. D.

OF TIEN TSIN, CHINA.

THE prominence given lately to the opinions and methods of Dr. Apostoli in his revival of this operation, long ago practiced both in America and England, stimulates me to put on record a single case never before reported, treated some years since in the city of Chicago.

The patient, then about 38 years of age, consulted me for menorrhagia which had existed about a year, and which had depleted her excessively at each menstrual period. The diagnosis of fibroma had not previously been made, but the uterine cavity was found $6\frac{1}{2}$ inches in depth, and with quite uniform and symmetrical enlargement of the anterior wall. Intra-mural fibroid seemed to be present, probably in places also sub-mucous, accounting for the alarming hemorrhages.

Electrolysis was done Feb. 6, 1875, with the assistance of Prof. John E. Owens, in the following manner:

A Schlotterbeck's speculum was introduced edgewise, handles down, and the vagina distended as widely as practicable

by elevation of the bladder; the anterior wall then fell into easy reach.

Two platinum pointed needles, insulated in the shaft, were used. Held firmly by a Sims' needle holder they were crowded into the dense mass of the tumor till the points were well buried, as high up as seemed prudent, in avoiding bladder and peritoneum, and as far apart as possible, which was but little over an inch. They were then made anode and cathode respectively, of a 15 cell zinc carbon battery, run with bichromate solution and freshly charged; this current would raise about 2 inches of fine platinum wire to a red heat, but measurements by milliamperes were not then in use. I was accustomed to use rheostat and galvanometer graduated up to 1000 ohms in using the galvanic current ordinarily, but in this instance only placed the galvanometer in the circuit which was closed with the full strength of the battery. Being unanæsthetized, the patient felt a light shock upon closing the circuit, and a slight burning sensation while it was continued. After the first six minutes it was reversed by the commutator to get the caustic action of the cathode in both punctures, and after another six minutes was withdrawn. No bleeding followed the withdrawal of the needles, and the patient had no severe reaction. Still rest in bed for a few days was advised until all possible danger of inflammation was past. This operation was performed soon after menstruation. The next period came regularly and was much more natural.

On March 30, the bulk of the tumor having become much less, a second operation of electrolysis was performed, in all respects like the first, except that at the patient's request a whiff of chloroform was given to quiet her nervous dread.

On June 10, I find this entry: No remains of the tumor to be found except, perhaps, in a little enlargement of the cervix.

The state of this patient's health was under my personal cognizance for several years, and continued good, since which I have had messages and indirect reports from her, all good. So far as I know she is still living, and in perfect health.

The method of application will be noted to differ from that advocated by Dr. Apostoli, but it is doubtless as true in this

as in other diseases that no one line of treatment is equally applicable to all cases.

Intelligent surgeons will, of course, always try to conform special operative procedures to the needs of the particular case in hand. And I would suggest that inasmuch as acupuncture itself is known sometimes to set up absorption in fibroid growths, will it not be well sometimes to use the much greater stimulating power of electro-puncture to start an involution by burying one or both electrodes deeply in the mass of the tumor, rather than to rely on placing one over the abdomen, and the other in the uterine cavity.

The wonderful progress of the use of electricity in the arts has brought with it instruments of precision unknown a few years ago, and which, by the practical suggestions of such men as Stevenson, of London, Martin, of Chicago, Carpenter, of Cleveland, and others, are being brought into the range of electro-therapeutics. While recognizing these, however, let us not forget the labors of a host of predecessors, whose researches have made possible the present advance.

EDITORIAL ARTICLES.

NOTE ON A NEW TREATMENT OF LARGE DERMOID CYSTS OF THE NECK.

The great disfigurement produced by these tumors, unpleasant as it must be to the sufferers, is not as a rule sufficient to drive them to submitting to the operation of excision. Those patients who have come under my observation suffering from these cysts have all, by the time the swelling has reached a certain size, been warned by some medical man or other of the serious dangers they would run from operative interference. Nor were these warnings without justification.

The method of operating in most favor among the most advanced and careful surgeons is at present complete excision.

Now, however careful or advanced the surgeon may be who excises cysts of the neck of the size and situation of those which I have especially in mind in writing this note, the operation must remain a serious and a dangerous one. Only quite recently I know of a case in this city, in which a surgeon of distinguished operative skill and unsurpassed experience, spent two hours in dissecting out one of these tumors. All the time the patient was of course under an anæsthetic, chloroform I believe, the loss of blood was considerable, the difficulties of preserving strict antisepticism not small, owing to the number of forceps, retractors, sponges assistants, etc., required, and there was also the risk of wounding some large and deep vessel or of the entrance of air into a vein.

On September the fifteenth, of last year, 1887, I operated on a dermoid cyst of the neck which covered the whole left side of that region extending from the jaw to the clavicle, both of which bones it had the superficial appearance of overlapping. Or, rather, in the case of the jaw the inferior angle seemed to be considerably pushed outwards. On the patient's recovery from the operation this projection had disappeared so that it must have been only apparent and not real.

The patient, Benjamin M., aged 37, had been a soldier. He had been in Netley Hospital for this tumor and dismissed the service in

consequence of it. Puncture or some similar form of treatment was said to have been tried, with the result of making him very seriously ill with local inflammation. He was then, according to his own account told that nothing more could be done. He was admitted into W. L. H. Ward of the West London Hospital.

The parts having been prepared and aseptized and the patient anæsthetized, I commenced with the intention of excising the cyst. I made a transverse incision, curving along below the jaw, and after securing the vessels divided, by catch forceps, began to separate the cyst from its coverings. But everywhere I found it exceedingly adherent. After laboriously exposing about six square inches of the surface of the tumor, the idea occurred to try another plan. A transverse oval button-hole, three inches long, was cut out of the wall of the tumor and immense quantities of stinking cheese-like substance came out, partly spontaneously, partly by squeezing and scooping and sponging. When the cyst was empty, the finger in it could feel its deep wall in close apposition with the left and posterior aspect of the larynx, with the styloid process, with the carotids and in fact with every hard or pulsating deep structure on the corresponding side of the neck. Pouches extended beneath the chin, backwards beneath the angle of the jaw, and downwards to the root of the neck.

Then began a long-continued and minutely executed process of cleansing and aseptizing. The edges of the hole in the cyst-wall being held up with catch-forceps, the interior was first wiped again and again with sponges wrung almost dry after being carbolized. Then the same process was repeated with sponges wrung out in solution of corrosive sublimate, 1 in 2000, finally, the cyst being apparently perfectly sweet and clean and fleshy looking and the sponges returning sweet and clean from every cranny of it, it was thoroughly douched with warm boracic lotion.

The hole in the cyst wall was then sutured to the skin wound and a drainage tube was placed in the skin wound outside the cyst.

The cyst itself and its pouches were stuffed with long and sufficiently wide strips of iodoformed gauze each with an end projecting out of the wound. The number of strips was carefully noted and care had been

taken to leave no sponge or fragment of sponge in the recesses of the cyst.

The after-treatment occupied about a month, the patient feeling quite well all the time and being only kept in the hospital by repeated warnings of the danger he would run by going away. The iodoform packing was removed and replaced every four or five days, being diminished in size each time until at last a small drainage tube was substituted.

Iodoform and sublimate dressings were used externally, and the head, neck and chest were fixed throughout the treatment in a cuirass of poro-plastic felt.

This patient was seen a week or two ago still quite well, with less deep cicatricial contraction than might have been expected. His appearance is, of course, greatly improved. He now looks quite smart and soldier-like again, and says that his own brother when he first came out of hospital, did not know him.

It seems reasonable to expect that this treatment by emptying, minutely cleansing with antiseptic fluids and then filling with tampons, gradually reduced in size at each dressing would succeed in other similar cases as well as in this now recorded. It is beyond comparison easier, quicker in execution and safer than excision. It may be said against it that there is danger of absorption of the antiseptics used. But surely there is danger enough of such absorption in prolonged operations of excision done with antiseptic precautions. I beg to urge that the sponges should be well wrung out before each using and that the final douching should be a copious one of boracic lotion. No loose iodoform powder should be dusted on the iodoform gauze. But care should be taken that the strips are fresh and clean and not handled and fingered about by subordinates.

As in every other case of sponging out cavities and of tamponade, the surgeon must not forget to see that every substance is taken out which has been placed in the cavity.

In my case I used silver with which to suture the cyst to the skin. The knots interfered with the changes of the iodoform tampons, and it would have been better to have employed silk. C. B. KEETLEY.

THE DIAGNOSIS AND TREATMENT OF PANCREATIC CYSTS¹

In an excellent inaugural dissertation, Dr. Treiberg, of Nikolaiev, presents a report of a case of pancreatic cyst cured by operation, although not diagnosed prior to opening the abdomen, and in connection with this case he presents an excellent review of the subject. The literature of cyst of this viscus has also been recently enriched by a report of a case treated by Kocher², of Berne.

The case of Treiberg was as follows: A blacksmith, æt. 22 years, was admitted with extreme emaciation and prostration, anorexia, nausea and vomiting, oppression and painful tension in the epigastrium and right hypochondrium, paroxysms of agonizing epigastric neuralgia, spreading to the loin and down to the right thigh. All those symptoms, as well as a steadily increasing epigastric tumor, had developed during the last three weeks, after the patient's recovery from severe injuries inflicted by several miscreants six weeks before the admission. The epigastrium and an adjoining part of the right hypochondrium were found to be distended by an extremely tender, smooth, elastic, fluctuating, but slightly movable, globular tumor whose inferior segment was situated two fingers' breadth from the navel. An exploratory puncture withdrew a colorless; serous, slightly opalescent, alkaline fluid rich in sodium chloride and proteids. On percussion, the dulness over the cyst was found to be continuous with that of the liver. The urine was normal, stools sluggish. A hydatid cyst connected with the liver was diagnosed, and eleven days later the operation performed.

Having made an oblique incision, slightly outward from the right rectus abdominis, the author divided the peritoneum and attenuated omentum, emptied the cyst by puncture, stitched its wall to the abdominal incision, split up the sac, stitched the lips to those of the abdominal wound, washed the cavity with a sublimate solution, inserted a thick drainage tube and applied an antiseptic dressing. The after

¹Diagnosis and Treatment of Pancreatic Cysts. By Dr. J. TREIBERG (Nikolaiev, Russia). Kharkov Inaugural Dissertation, 1888.

²Case of Pancreatic Cyst cured by Incision with Drainage. By Dr. LARDY (Berne). *Correspondenz-Blatt fuer Schweizer-Aerzte*. May 1, 1888.

treatment consisted in daily irrigating the cavity, first with a 4% boracic solution, and a month later, with the Lugol's solution. On the eighth day the wound was found closed *per primam*, except at the site of the drainage, where there remained a fistula discharging a fluid which proved to be pancreatic juice and which gave rise to an obstinate eczematous rash in the neighborhood of the opening. The fistula gradually healed about the one-hundredth day after the operation. The temperature never rose above 37.8°C. The man's digestion, urine, in fact, everything, except the cutaneous irritation, remained normal from the beginning to the end, the patient leaving the hospital in flourishing health to at once return to his heavy work. He was still quite well and strong when examined 1½ year after the closure of his fistula.

Kocher's case was a previously healthy man, æt. 37, with a good family history, who was suddenly seized with agonizing abdominal pains, which disappeared spontaneously several hours later. At the end of four weeks a second attack occurred, to last this time for about eight weeks. About eight or ten days after its commencement, the man's epigastrium began to increase from day to day, and in a fortnight attained enormous dimensions and remained in this state up to the operation. During the period of active growth of the tumor the patient kept his bed, since movement increased the abdominal pain and tension. His appetite at the time was good, stools regular, but discolored and flattened. For a couple of months his state was tolerable, but later on there commenced to occur attacks of violent vomiting, which gradually became more frequent, and ultimately, daily. At the same time, steadily increasing emaciation and prostration supervened.

About eleven months after the first symptoms, he sought admission to Prof. Lichtheim's clinic, where an exploratory puncture was made which extracted a dark-red, sanguinolent fluid containing numberless intact red blood corpuscles, fatty-granular globules with hæmatoidine scales and cholesterine crystals. The puncture was followed by peritonitic symptoms of eight days' duration. An abdominal tumor having been diagnosed, the man was removed to Prof. Kocher's wards. The examination detected a very large, non-adherent, smooth, fluctuating, globular tumor, whose inferior segment was felt midway between

the navel and pubes. After an artificial inflation of the stomach and bowels, it was found that the cyst was situated behind the former organ and the transverse colon, and a pancreatic cyst was diagnosed.

The operation was performed 26 days later, by Prof. Kocher under all antiseptic precautions as used by him. Having made an incision 12 cm. long, midway between the xyphoid cartilage and navel, he opened the peritoneum, split up the gastrocolic ligament, fixed the cyst at the angles of the abdominal wound, emptied its contents with a large Spencer-Wells' trocar enlarged the puncture and stitched the edges of the incision to those of the abdominal one. The contents (a dark red, viscid liquid) amounted to 10 litres. The inner surface of the sac was fairly smooth, whitish-yellowish, non bleeding. The cyst rapidly contracted during the operation. The remaining cavity was plugged up with iodoform gauze, and sublimate dressing was applied.

The wound rapidly healed *per secundam*, the highest reading of the temperature being 38°C. on the second day. The man was quite well when shown to the Berne Medico-Pharmaceutical Society on the fifty-fifth day after the operation. There could be still felt a pretty thick band at the site of the cyst. An analysis of the cystic fluid made by Prof. von Nencki failed to find trypsin or, in fact, any thing characteristic beyond the circumstance that the liquid could convert starch into glucose.

Treiberg presents a complete review of (1) the cases of Zukowski, Kulen, Kamyff, Bozeman, Gussenbauer, G. Dixon, Riedel, Salzer, Senn, Kramer, Kootz, Kuester, and Subotic, where a pancreatic cyst similarly gave rise to surgical interference. The cases of Thiersch, Dobrzycki, Leucke and Klebs are left out of consideration as "rather doubtful"; and (2) such cases of pancreatic cysts from international literature, where no operation was performed. From a careful analysis of all these cases the writer draws the conclusion that, as a rule, a pancreatic cyst can be diagnosed before the operation, though up to the present the diagnosis has been made only in three cases—in those of Senn, Kuester, and Subotic, to which we may add now W. T. Bull's (ANNALS OF SURGERY, vol. vii, p. 393, May, 1888), and Prof. Kocher's related in the present article.

The following symptoms are scrutinized in detail: 1. *General emaciation* of high degree, which is observed in a majority of cases, and, as the writer believes in common with Kuester, is dependent upon a lesion of the solar plexus and semi-lunar ganglion. A rapid emaciation following the development of a relatively small epigastric cyst is thought to be a very valuable differential symptom, since small-sized cysts of a non-pancreatic origin are not accompanied by any marasmus. 2. The presence of a more or less considerable amount of *undigested striated muscular fibre in the patient's stools*, which results from a defective secretion of the pancreatic juice. 3. *Celiac neurægia* which is met with in most patients and is extremely important as a differential symptom, since as far as epigastric tumors are concerned, it accompanies only pancreatic cysts. "The patient usually complains of paroxysms of agonizing pain situated somewhere deep between the ensiform process and navel and irradiating into the hypochondriac, lumbar and sacral regions; the attacks are sometimes so severe that the sufferer falls into swoon and collapse; in some they are accompanied with mortal anxiety, oppression and restlessness."

Such symptoms as "pancreatic sialorrhœa and diarrhœa," steorrhœa and diabetes, jaundice and dyspepsia are said to be either problematic, or non-characteristic or secondary. A paramount diagnostic importance is attributed, (1) to the cyst examined being situated behind the stomach and transverse colon and being distinctly separate from the liver, which relations can be fairly easily demonstrated by percussion after inflation of the stomach and bowels; and (2) to the microscopical and chemical examination of the fluid drawn out of the cyst by means of a puncture.

The points described above are said to enable the surgeon to differentiate a pancreatic cyst from a hydatid of the liver, ovarian, mesenteric, omental and renal cysts, dropsy of the omental bursa or of the gall bladder. In doubtful cases an exploratory laparotomy is indicated. *Prognosis* in cases of pancreatic cysts, when left to themselves, is regarded as extremely grave. On the other hand "they are fairly easily accessible for operative treatment" which should be resorted to as soon as the diagnosis has been arrived at. The most ra-

tional ("ideal") method is *extirpation* of the cyst. Unfortunately it is practicable only in such exceptional cases where a pedicle is present, (as happened in Bozeman's case which ended in recovery). As a rule there is no pedicle, and, besides "the cyst lies in close contact with structures, a lesion of which is almost equivalent to capital sentence." The cases of Zukowski, Riedel, Salzer and Kootz where extirpation had been attempted, ended in death. In the remaining cases treated surgically up to date, *incision* and stitching with *drainage* were resorted to, every one of the patients making a complete recovery. The best way is said to be the operation at one sitting. A perfect isolation of the peritoneal cavity can be at once secured by a careful stitching.

Amongst other things, the writer recommends to keep in mind that, in cases of thin-walled cysts, the wall can give way under the pressure of a drainage tube.

The second division of Dr. Treiberg's monograph contains a lucid exposition of the results of a laborious experimental inquiry which has been undertaken by him at Prof. S. D. Kostuerin's laboratory, in Khar'kov, in order to elucidate the question, whether there arise any serious disturbances in the animal system after the pancreatic juice has completely and permanently ceased to find its way into the bowel. The question has, obviously, a considerable practical importance both for the surgeon and physician, not to speak of its being extremely interesting also for the biologist. Hence, international literature contains a fairly long list of experiments with ligaturing or plugging the Wirsungian duct or partial or total extirpation of the gland. The experimenters, however, are far from being unanimous in their answers to the question above. Thus, while Brunner (dogs), Colin and Bérard (dogs, calves, geese, ducks), Herbst, Cash, Schiff, S. Pavloff (rabbits), Arnozan and Vaillard (rabbits), Finkler; Rémy, Showe, Klebs and Munk obtained only negative results, Cl. Bernard (dogs), Langendorff (pigeons), and N. Senn (dogs and cats) saw death pretty rapidly following the procedures.

Dr. Treiberg's experiments consisted in antiseptically ligaturing the duct in rabbits. Every one of the animals remained alive and sound

in all regards, (leaving aside loss of appetite and weight for the first two or three days after the operation—the phenomena which were observed also in the control-animals in which laparotomy alone without ligaturing the duct had been made). At an earlier or later date the animals were killed, and their pancreas as well as other organs examined. Dr. Treiberg's results, which are generally in accord with those of Pavloff, may be condensed thus :

Rabbits bear the ligature of their pancreatic duct in best way possible. A complete cessation of the flow of the pancreatic juice into the intestinal canal does not give rise to any visible alterations in their urine or stools.

2. The animals do not show any emaciation. Hence, marasmus occurring in patients with pancreatic cysts cannot possibly be explained by a deficiency in the pancreatic juice.

3. Similarly, stearrhœa and glycosuria cannot be regarded as manifestations of functional disturbances depending upon pancreatic disease, and generally, can possess but a very subordinate diagnostic significance amongst the symptoms characterizing a pancreatic cyst.

4. The ligature of the Wirsungian duct in rabbits gives rise to a chronic interstitial process in the gland, which, for a fairly long period, is not accompanied by any degenerative alterations in the secretory elements. A certain portion of the latter appears to perish with time in consequence of a simple atrophy. The remaining elements for a very long time retain all their peculiar vital properties.

5. The ligature of the main duct is invariably accompanied by a more or less considerable dilatation of the secondary duct.

6. The ligature acting as a foreign body, can give rise to proliferation of the epithelial lining of the duct in the shape of glandular tubes penetrating into the subjacent connective tissue which similarly and simultaneously undergoes proliferation, in other words, the ligature can give rise to the development of cysts belonging to the type of "cysto-adenomata." It is highly probable that in man a plugging of the duct with concretions can lead to the formation of pancreatic cysts in the same way.

VALERIUS IDELSON.

INDEX OF SURGICAL PROGRESS.

BONES, JOINTS, ORTHOPÆDIC.

I. The Treatment of Advanced Conditions of Equino-varus. By R. SWAN (Dublin). When, says the author, the person afflicted with equino-varus has reached the age of ten years, either with early treatment and subsequent relapse, or without treatment, features are presented which preclude the hope of success being attended by tenotomy and extension. The tarsal bones are thickened, and the typical distortion is increased. The large adventitious bursa is dense, and includes in its base, the cuboid and the tarsal end of the fifth metatarsal bones, and may extend to a greater or less degree on the dorsum of the foot. In such case ablation of a portion of the tarsal bones is called for, provided an atrophied condition of the anterior part of the foot does not exist. The portion removed will consist of the anterior three-fourths of the cuboid bone, all the external cuneiform except its posterior part, the proximal extremities of the third, fourth and fifth metatarsal bones, and the apex of the wedge will consist of a portion of the middle cuneiform. Attention is drawn to the fact that after this operation the mobility of the foot will remain almost unimpaired. As the metatarsal bones have their epiphyses at the distal end, it is probable that the development of the foot would not be interfered with. The author had operated at the time of the reading of his paper, upon thirty-four selected cases since 1876.—*The Dublin Journal of Medical Science*, May, 1888.

H. PERCY DUNN (London).

II. Rare Fracture of Olecranon. By JORDAN LLOYD (Birmingham.) This was a specimen obtained by excising the elbow for an unreduced dislocation of 18 months standing. The olecranon was

fractured from its upper end at its posterior surface downwards and forwards into the centre of the sigmoid notch. The fragment had been driven downwards and forwards so as to narrow the notch and mechanically prevent reduction of the humerus into the sigmoid cavity thus contracted.—*Brit. Med. Jour.*, March 17, 1888.

C. B. KEETLEY (London).

III. The Treatment of Club-Foot by Immediate Restoration of the Parts to their Normal Position after Tenotomy. By W. J. WALSHAM, F.R.C.S. (London). Discussion has lately taken place in the *Lancet* as to the best and safest method to be used in the cases of talipes; and Mr. Walsham, as surgeon to the orthopædic department at St. Bartholomew's Hospital, gives his experience. He originally employed the slow method, but was dissatisfied with the delay and difficulty in obtaining the expensive apparatus necessary for this method. By slow degrees he reduced the foot to a greater extent after the operation, and meeting with no untoward results, finally reduced the deformity immediately. His method is to divide the tendon; break down any adhesions by forcible but gentle wrenchings; close the puncture with a dossil of lint soaked in carbolic oil or iodoform gauze; carefully enclose the foot in a domett or cotton wool bandage according to the age of the patient, and secure it in Plaster-of-Paris. The plaster is left on for ten days or a fortnight unless any special reason is seen for removing it earlier. He claims for this operation the following advantages over the slow method. (1) Great saving of time, (2) the doing away with the necessity of an expensive extension apparatus. The disadvantages attending the rapid, but not applying to the immediate method are. (1) Considerable pain is often caused by the force which has to be employed in stretching the uniting material at each changing of the plaster, and (2) that in severe cases the reparative material cannot always be stretched sufficiently to overcome the deformity, and it is occasionally necessary to divide the tendon.—*Lancet*, May 19, 1888.

H. II. TAYLOR (London).

IV. Drainage of Joints Versus Excision. By BENJ. WAIN-

WRIGHT, F.R.C.S. (London) At the Clinical Society's meeting on April 27, Mr. Wainwright gave an account of a case of a boy, æt. 3 years, who suffered successively from abscesses of the left thigh and right hip, which were treated by antiseptic incision and drainage, a little carious bone being removed from the neck of the femur in the second case, and the cure in each case being complete. The child then developed a synovitis of the left knee from which Mr. Wainwright removed a quantity of synovial overgrowth by means of sharp spoon and scissors. The joint healed in good position, but became flexed after leaving the West London Hospital, and is now immovable.

Some of those who commented on the case suggested pyæmia as the cause of these successive affections, but this was thought by Mr. Wainwright to be unlikely, because the temperature never rose above 100°. He considered his result superior to that which would have been obtained by excision. The balance of opinion inclined to the view that the disease in the knee was strumous.—*Lancet*, May 5, 1888.

A. F. STREET (Westgate).

V. Arthropathy in Locomotor Ataxia. By DR. TH. WEIZSACKER, (Tuebingen.) This paper is introduced by a review of the not very extensive literature of the subject, from T. R. Mitchell in 1831 down to the discussion at the last session of the Congress of German Surgeons. In addition to three cases recorded by Bruns, one hundred and seven cases occur in the literature of the subject. The insidious and painless onset of the disease* of the joint in most cases will probably explain the fact that for many years this form of joint trouble in tabes has escaped the notice of many acute observers. Many cases occur also where the symptoms of spinal sclerosis are yet slightly marked. Erb in 56 cases of tabes has found the joint affections present in only two. The affection may appear as early as the 18th or 20th year of life (Charcot, Ferré.) Of 109 cases 72 are male; the severer cases, however, occurring in women. In 109 cases 169 of the larger joints were involved, 87 joints being those of the left side of the body. In a patient of Charcot's both shoulder articulations, the right hip joint and the right maxillary articulation were affected. Bourneville

also records a case of polyarticular affection. Over one half of the cases show the affection in the knee-joint. The hip, shoulder, ankle, elbow follow in order of frequency. The rarer affection is that of the vertebral articulations and that of the jaw. In two cases we find multiple affections of the finger joints.

The sudden onset of the joint affection is characteristic, and this without any causal agent known to the patient. The rapid course of the disease unaccompanied by pain and reaction, resulting in complete destruction of the joint structures within a short period. The above invasion may occur at a time when the symptoms of the first stage of tabes are present or only slightly marked (lancinating pains, gastric crises, spinal pupil, etc.) An exacerbation of gastric crises or lancinating pains may usher in the joint affection.

Incoordination becomes most marked with the onset of the joint trouble, and eventually disables the patient. The beginning of the disease is marked by the patient suddenly falling, one knee giving way with audible noise; the patient may subsequently be able to go about his work. Exceptionally the accident is accompanied by a lancinating pain. In a few hours great swelling of the affected joint and extremity sets in. Again the swelling may set in without any above symptoms and first attract the notice of the patient when rising in the morning. Patients who are confined to bed may develop an arthropathy and notice it on attempting to walk (Aitkin, Dreschfeld.) The neighboring soft parts become swollen with the joint, a resistant elastic œdema of the limb results without reddening of the skin. In the slight forms of the disease the swelling, creaking through active or passive motion, may disappear, yet returns of the disease may occur, the joint may be restored or the same may show slight changes. In the severer forms, the swelling, the destruction of joint structure, ligaments and articular extremities, the enlargement of the latter, the capability of abnormal hyperextension, rotation, adduction, abduction, extensive effusion are all characteristic. Raven reports a case of exaggerated conditions of this kind. The forms (hypertrophic) of free or sessile bodies in the joints are less common. The knee and elbow are seats of this variety. In the foot the tarso-metatarsal joint is characteristic-

ally affected (*pied tabétique*.) In all the above the complete absence of pain and reaction is a marked feature. The pathological changes involving the joints are still among the mooted questions. Virchow declares them identical with those found in *arthritis deformans*. Thus far there has been a great diversity of opinion based perhaps on conclusions drawn from very imperfect and partial microscopical examinations. The capsule and ligaments of the joint are found in a condition of chronic inflammation in which we may be confronted by a hypertrophic condition of these structures or an atrophic condition with complete final disappearance of synovial membrane and ligaments. The cartilages also show changes of chronic inflammation. The bones both the articular extremities and the diaphyses are found in a condition of chronic inflammation with a rarefaction of bone tissue (*rarefying osteitis*.) Here the articular ends of the bones may be greatly enlarged though rarefied, *osteophytes*, and free bodies may be abundantly present; the former may exist along the shaft of the bone outside the joint. Again atrophic changes may cause a complete disappearance of the heads of the bones with their articular cartilages. The ends of the diaphysis will then project into the joint. They have been likened in shape to drum sticks. The cavity of the joint may be filled with a clear synovial fluid, or rarely blood and still more infrequently pus may be present. Among the complications of this arthropathy are first, luxations and subluxations. These, though easily corrected, are still very difficult to treat and keep corrected. Fractures either within or without the joint are recorded. In the hip joint the complication of luxation with fracture of the shaft of the femur being attended by enormous swelling makes a correct diagnosis as to position or existence of fracture almost impossible. Charcot describes in double arthropathy of the knee-joint certain trophic (?) changes as dystrophy of the nails on the toes, thickening of both lower extremities, deformity of the foot. Falling out of the teeth of the upper jaw has also been observed (*Richardiére*.) Marked muscular atrophy has been observed in the extremities (*Buzzard*.) Syphilis has been established to exist in 13 patients of the 109 recorded cases. In marked contrast to the general painless course of this peculiar joint affection,

Bull, Clifford, Albrecht, Buzzard, Westphall have recorded cases where the joint affected at the outset was accompanied by painful swelling, heat, and redness of the skin over the joints (knee or finger) affected. No satisfactory explanation has been offered of these exceptional phenomena. In one case the above symptoms lasted $1\frac{1}{2}$ months (Buzzard.) We must in these cases eliminate the lancinating neuralgic pain ordinary to tabetic individuals. It is of great importance to note the rarity of suppuration in this arthropathy. In two cases the suppuration may be accounted for on traumatic or infectious grounds; in five others no causal agent was discovered in the history of the cases. The nature of this arthropathy has not yet received satisfactory explanation. Charcot's theory of the degeneration of the anterior grey horns has been abandoned. Virchow makes the disease a simple chronic arthritis deformans, the pathological changes taking their origin in the cartilages of the joint. Again the theory of the traumatic origin of this arthropathy has its defenders to-day. The vaso-motor theory has also its school, and finally the classification of these joint phenomena among the peripheral neuroses with trophic changes. Syphilis (Strumpel) is still thought to play an important role here. Weizsacker thinks we have in this disease a peculiar affection directly connected with disease of the nervous system (neurotic in nature.) He favors most the theory of disease of the peripheral nerves as an etiological factor in arthropathy of tabes.—*Beitrage zur Klin. Chir. von Bruns*, 1887.

HENRY KOPLIK (New York).

TUBERCULOSIS OF THE SACRO-ILIAC JOINT.

By WELLER VAN HOOK, M.D.,

OF CHICAGO.

HISTORY.—If we may judge from the literature which we have inherited, the existence of sacro-iliac tuberculosis was unknown prior to the present century. True, the ancient and mediæval leeches from Hippocrates to Ambroise Paré found delight in the study of the condition of the pelvic symphyses during pregnancy and parturition. And Louis records some traumatic lesions of the sacro-iliac joint occurring in the practice of Philippe de Chartres; while L'Heritier had a case which Delens thinks was probably one of preternatural mobility of that articulation compensatory to ankylosis of the hip-joint.

But it is not until we reach Boyer that we really find an account of the disease in hand. In 1821 Boyer described sacro-iliac disease as a chronic affection of the sacro-iliac joint, distinctly indicating his opinion that the disease was of scrofulous origin, and that it was pathologically similar to "spontaneous luxation" of the hip-joint.

Attention having been called to the possibility of disease at this location, Velpeau three years later drew attention to supuration there during the puerperium, and considered the sacro-iliac joint as the point of origin of other suppurations found at autopsies. In later years Velpeau described in his clinics cases of true sacro-iliac disease distinguished clearly from puerperal metastatic infection. One of his internes wrote a monograph upon this subject a few years later.

Larrey described the affection briefly under the term sacro-oxalgie, which he was the first to use. He compares it with tumor albus of other joints.

In 1833 Langier published an article in the *Dictionnaire Medicale* which has been much read; and in the same year

Hahn published in German an important monograph which was quite a complete résumé of the subject.

Sacro-iliac disease has been a favorite topic for theses of the Faculty of Paris, among which are those of Frère (1838), Girauld de Nolhac (1840) and Delineau (1842), who, inspired by the lectures of Larrey, made an important contribution. Then come the names of Joyeux (1842), Maisonneuve, who (1844) detailed the chief points in the differential diagnosis between sacro-iliac disease and morbus coxarius; and Nélaton (1847), who gives a résumé of the history of the study, which had hitherto been much neglected.

Gurlt, in 1853, gives many valuable facts in his treatise on joint affections.

But to Erichsen, of England, belongs the credit of having formulated in a lecture published in the *Lancet* (1859, 9, p. 25) a clinical account of the disease, which at that early and important date directed the course of investigation, and clearly fixed many of the chief points in the differential diagnosis.

Three years later Boissarie collected some observations and made a study of the disease, while Velpeau again directed attention to the subject by a lecture.

Lectures by Gosselin and Broca in 1868 contributed to the elucidation of the diagnosis of the disease, while in the same year Duplay gave in his *Traité de Pathologie* a complete study of the subject.

Holmes' "System of Surgery," 1870, contains an excellent article by A. Johnstone on acute and chronic sacro-iliac disease.

In 1873 the theses of the Faculty of Paris again afford a paper on this subject by Delens, who has presented a monograph which is a model of scrupulous care in the collection of material, and of almost judicial firmness in the exclusion of irrelevant or imperfectly substantiated evidence. With such scientific conscientiousness has the work been done that I can only criticise the facts that the work of foreign writers has not been completely presented, and that some cases of disease of the sacro-iliac joint due to infection by other microbes than that of tuberculosis, although clearly diagnosticated, have been given a place, not only in the list of cases, but are even intro-

duced to illustrate the symptomatology and diagnosis of the disease.

In 1875, A. Bounaix presented to the Faculty of Paris a thesis on the same subject, describing four instructive cases of the disease, three of which were examined *post-mortem*.

In the following year, Heath published in English an account of several cases more or less complete, chiefly with a view to illustrate a special method of treatment.

Poore, in 1878, published in the *American Journal of Medical Sciences* a review of the subject from a clinical point of view, followed by a collection of literary references. The chief bulk of this paper is taken up with the analysis of 58 cases which he has collected. It is, however, unfortunate that the writer has not given specific reference to each case in order that later students might examine them with the added knowledge of recent pathology and of modern surgical treatment. Especially is this true since the writer has introduced numerous examples of gonorrheal as well as primary and secondary suppurative affections of the joint. His statistics being thus vitiated lose much of their scientific value.

Prof. L. A. Sayre, from the abundance of his experience, was able in 1879 to refer in a clinical lecture to eighteen cases of sacro-iliac disease with only one death. Besides the case taken from his Orthopedic Surgery, I am fortunately able, through the courtesy of Prof. Sayre, to present the details of a number of cases which were merely referred to in the clinical lecture. In his orthopedic surgery the same distinguished writer has referred to the disease, and has given an account of the operative interference to which he has resorted in certain cases where abscesses had formed.

In St. Petersburg, G. Tiling published in 1883, in the *Medicinische Wochenschrift* of that city, an account of four cases in two of which operations were made that were intended to be as nearly radical as possible. The article is, therefore, of considerable value, and will be referred to again.

Only last year F. J. Gant reported two cases in which he had performed *évidement* with a successful result.

It will thus be seen that the subject of sacro-iliac disease has not received the same degree of attention that has been

given to tubercular affections of other joints. This is to be accounted for both by the fact that the disease is quite rare, and also that the diagnosis is often so difficult that doubtless many cases have escaped detection.

ANATOMY AND PHYSIOLOGY.—The anatomy of the sacro-iliac joint has been a subject of discussion for many years, apparently because but few anatomists have studied the articulation carefully and minutely, rather than that the joint presents any special features of difficulty in investigation. Its classification has been a matter of embarrassment because of the variation in the point of view from which authors regarded it, some bearing in mind chiefly its mobility, others its cartilages, and still others its means of union. Thus Boyer ranked it, on account of its slight mobility, among the synarthroses. Blandin regarded it as a diarthrosis, while more recently M. Cruveilhier considers it an amphiarthrosis. With this last conclusion, M. Sappey, whose observations vary but slightly from those of Luschka, is in accord. Delens¹ considers this decision a just one because of the clinical resemblance of sacro-iliac disease to Potts' disease of the spinal column.

To discuss anatomical details, Henle's account of the capsule seems to be the most careful and reasonable of the recent descriptions. He says in his *Anatomie des Menschen*:

"The capsule of the ilio-sacral joint is periosteum, tightly stretched over the cleft of the joint, strengthened externally by horizontal fibres and, toward the joint cavity, covered with a soft vascular layer of connective tissue. It extends only upon that part of the joint turned toward the pelvic cavity, not immediately from the border of the cartilaginous layer, but at a slight distance from it, passing along near it from the anterior surface of the sacrum and ilium, so that here a small space remains into which synovia can escape. In this space are to be found low forms of synovial shreds, but they are also seen on the remaining cartilaginous surfaces."

It is thus seen that Henle recognizes a synovial element in the joint, a point not referred to by some of the earlier authors. Luschka, whose work on the "half-joints" (*halb-*

¹De la Sacro-coxalgie, p. 20.

gelenke) has become an honored classic, had already established¹ the fact that a cavity existed here at all ages and in both sexes, and had found in it a small quantity of pale yellow, viscid synovia. The same distinguished anatomist bears witness to the rich vascularity of the synovial membrane and of the fibrous capsule. The fact that the synovial cavity is, as it were, a mere cleft, accounts for its limited capacity.

The thickness of the cartilaginous layers is important in this diminution of the size of the cavity. Luschka states that the cartilage upon the auricular surface of the sacrum may attain a thickness of three millimeters². Henle, who gives the thickness of this cartilage as two or three millimeters, is in practical agreement with Luschka, while Sappey states that its thickness is from one to one and a half millimeters. All are agreed that the cartilage of the ilium is of less thickness than that of the sacrum, Henle stating that it is not over one millimeter in thickness.

Sappey³ remarks that the color of the sacral cartilage is not a dull white like that of the diarthrodial cartilages, but has a whitish or reddish gray appearance. Both Sappey and Luschka aver that the cartilage upon the sacrum is composed of an osseal hyaline layer covered by fibro-cartilage on the synovial side. Luschka alone states that there are two layers upon the ilium. Delens⁴ says, "In reality there is for the sacro-iliac articulation only one fibro-cartilage provided at its centre with a cavity analogous to those of the intervertebral discs. This cavity extends almost up to the limits of the fibro-cartilage (it is that which permits its separation into two halves). It is in other directions of very limited extent."

The only remaining soft tissue properly part of the joint is that of the ligaments, which are most satisfactorily described by Sappey,⁵ who numbers six distinct bands or masses. The ilio-lumbar, which he includes as belonging to this joint, passes

¹Delens, *ibid.*, p. 19.

²Virch. Arch. VII. 2, 1854.

³Quoted by A. Courty, Art. "Bassin", Dict. des Sciences Med

⁴Sacro-Coxalgie, p. 19.

⁵Quoted by Courty, as above.

from the summit of the transverse process of the last lumbar vertebra to the posterior portion of the iliac crest. A superior and an inferior anterior ligament are found passing between the sacrum and the innominate on their iliac and pelvic surfaces. By far larger and more powerful than these are the posterior ligaments, superior and inferior, which together with the inter-osseous ligament, extend from the rough space above the auricular surface of the ilium downward and inward to the depressions on the lateral mass of the sacrum.

The anatomy of the bones entering into the formation of this joint needs no elucidation here. Their relative form and position, however, should not be a matter of misapprehension. To quote from Quain¹, "In the erect posture the sacrum is thrown so much backwards that none of the advantage of the keystone of an arch is obtained by the tapering of its form from base to apex. It is only by the sinuosities of its auricular surfaces that it directly presses on the hip-bones; and as the width of the bone rather diminishes at the upper part, the principal strain is borne by the posterior sacro-iliac ligaments, from which the sacrum is in great measure suspended."

The part of the burden of the super-incumbent body that is transmitted directly in the line of gravity by the irregularities of the auricular surfaces is very small. For we must remember that these sinuosities are comparatively slight and that they are covered over and separated from one another by thick cartilaginous masses not sufficiently unyielding to transmit directly more than a small fraction of the force they receive. We are thus compelled to admit the very great physiological importance of the posterior ligaments. This is the more readily realized when we consider that half the weight transmitted to the base of the sacrum is conveyed to the right sacro-iliac joint, the other half to the left. "Each of these", says Sappey² "can be considered, in virtue of the parallelogram of forces as again subdivided. A part of the pressure is directed transversely outward and finds itself absorbed in the ligaments. The other part descends vertically and is communicated to the iliac bone

¹Elements of Anatomy, p. 167 1882.

²Anatomy, I, p. 595, 2nd edition.

which transmits it to the femur." In the sitting posture, he might have added, the point of support is the tuberosity of the ischium.

In these statements we have the suggestion of a physiological fact that, when the weight of the trunk is supported upon the ischia or upon the femora, the sacro-iliac joint cannot rest.

Anatomists are practically agreed that movement in this joint is well-nigh nil so long as the pelvis remains intact. When the pubic arch is removed, however, a rocking is possible as well as a slow gliding motion.

Peculiar changes occur in two conditions of life, namely, in pregnancy and in old age,

In pregnancy, as obstetricians are agreed, relaxation of the ligaments may occur in order to facilitate parturition. The swelling and softening of the articular cartilages is a concomitant phenomenon.

In old age atrophy and fatty degeneration of the same structures is observed in varying degrees.

PATHOLOGY AND PATHOLOGICAL ANATOMY.—The disease which engages our attention here differs from the same morbid process in other articulations only as it is modified by local conditions. The presence of a relatively small synovial membrane enclosed within massive walls composed of cancellous bones and bound almost immovably together by powerful ligamentous bands necessarily causes a modification of the features of the disease. But modified though it be, tuberculosis here must not be made to include any of the other numerous infectious joint diseases to which this articulation is liable. Such a statement seems superfluous; yet, while making the diagnosis of the form of infection, Delens has considered cases of rheumatic and gonorrheal inflammation along with cases of tubercular disease and Tiling has similarly introduced a case of acute infection due to a neighboring osteomyelitis. Even arthritis deformans has secured a place in the discussion. Indeed, while the name sacro-iliac disease, or as the French say, *sacro-coxalgie*, has been theoretically applied only to tuberculosis, it has practically been made to include, at least by very many writers, all of the diseases mentioned. Careful ex-

clusion of such cases would be of less importance if statistical studies were not vitiated by their introduction. This was the case with the otherwise very interesting study of C. T. Poore.

Tuberculosis here presents practically the same gross appearance as elsewhere. The microscopic lesions are also the same; the presence of the bacillus being in every instance the exciting cause of the tubercle-growth. Such being the case we are obliged to accept the theoretical possibility of the disease being primary here, as elsewhere, in the synovial membrane as well as in the bones near the joint. The researches of Schüller demonstrating the intra-articular origin of tuberculosis in the blood effused by traumas have here an important bearing. Schüller found that when one of the larger joints of an animal whose blood contained living tubercle bacilli was injured by the blow of a mallet, typical tubercles sprang up in the neighborhood of the effused blood. Such tubercles contained blood pigment, at once a relic and a proof of their hæmic origin. Such a determining cause may also influence the formation of tubercular foci in osseous tissue. Indeed, Sayre thinks that in every instance of sacro-iliac tuberculosis a trauma is the determining cause. Of primary synovial tuberculosis at the sacro-iliac joint, I am not able to find a single authentic instance of an observation either during operation or at a post-mortem examination. Delens¹ cites the view of M. S. Duplay who thinks that in women in child-bed it is by the serous membrane that the malady begins. Such a case as regards the origin in child-bed is No. 5, Table of Path. Anat. M. Morel presented the specimens of the case to the Société de Chirurgie. Unfortunately the record is not sufficiently complete to enable one to determine the primary focus of the disease. Dr. Satterthwaite, in 1877, presented to the New York Pathological Society a number of specimens from a case of "caries of the lumbar vertebræ, sacrum, ilium and sacro-iliac articulation."² "It was presumed that the fatal issue was due to the passage of pus into the spinal canal, setting up primarily inflammation of the meninges of the cord." "In separating the

¹De la Sacro-coxalgie, p. 24.

²N. Y. Medical Record, 1887, May 26, p. 327.

sacrum from the ilium there was a small spot of carious bone upon the opposed surfaces, the size of a three-cent piece." "Here the observation was quite early, but unfortunately the pathologist has left us no record of the state of the synovial membrane and cartilage. It is probable from the facts that both surfaces were affected to the same extent, and that the affected areas were opposed to each other, that the origin of the disease was between these diseased surfaces, that is, in the synovial membrane; for it is not likely that such surfaces accurately opposed to one another would be simultaneously rendered carious by disease advancing from the two cancellous bones below, since if a single osteal focus had existed, its nearest articular surface would have been more extensively diseased than the opposite bone. That primary synovial tuberculosis occurs in this anphiarthrosis is rendered probable also by the fact that many cases of the disease recover completely after comparatively slight disturbance of either general or local functions. Such cases, a number of which have reached this satisfactory issue in the hands of Prof. Sayre, lead one to think the original lesions must have involved some soft tissue—as the synovial membrane—whose implication gave rise to the symptoms of the disease but which was capable of speedy recovery. An absolute *restitutio ad integrum* is not readily conceivable when any considerable amount of disease is present. But if primary tuberculosis of this very limited synovial membrane ever occurs, a functionally perfect recovery is by no means out of the question. Of course, the limited functional range of the joint as such renders the point practically of very much less importance.

A priori we would conclude that the synovial membrane was far less apt to be primarily diseased than the bony tissue composing the joint, since the bones are of gigantic extent in proportion to the membrane, are very vascular, and are much more exposed to traumatism. As a matter of fact the bones were implicated in all the cases in which they have been examined at surgical operations, or at post-mortem examinations. Here, just as Koenig, Mueller, and others have shown in reference to other bones, we may have not only granulation-mass foci but also true sequestrum foci. For in twenty-

two autopsical observations, sequestra were observed four times; and Joyeux reports (See Table of Clinical Histories of Cases with Abscesses) a case in which three masses of bone passed at different times by the rectum. It is not our present purpose to detail the processes by which either local extension or recovery takes place. It is sufficient to recall the fact that, when the process is devoid of rapid coagulation necrosis, and fluids are present in minimum quantities, recovery is more common than when tubercular pus is formed and assists in carrying the bacilli to a distance. Indeed, we shall see hereafter that in the whole literature of the subject but one case is recorded (that of Hilton) in which recovery took place without some sort of operation when abscesses had once formed.

The moist form—the form of the disease characterized by cold abscess formation—may be associated with the sequestrum or may originate in the granulation-mass form; it is usually at first simply tubercular in nature but almost invariably becomes at last infected with other microbes than those of tuberculosis, the infection taking place from the blood or from without, generally from rupture or artificial puncture of the abscess wall.

The conditions bringing about tubercular abscess formation, though not severally demonstrated, are capable of being embraced under two heads, those influences favoring the physiological activity of the microbes, and on the other hand the circumstances militating against tissue resisting power. The subject cannot be discussed here, and is only mentioned to permit the suggestion that before abscess formation has occurred, every possible general as well as local advantage should be accorded to the patient in order that he may retain the balance of power.

For, this balance of power once turned in favor of the bacilli, granulation tissue is formed more rapidly than increase of nutrition takes place and the result is coagulation necrosis of the new formed tissue. The cheesy material thus formed, together with a quantity of serum, leucocytes and shreds of connective tissue, constitute the so-called pus which, though exhausted as a culture medium, is capable of carrying the bacilli

of tuberculosis to previously sound tissues whenever the limiting layer of granulation tissue yields to the increasing pressure of the fluid within. If the point of origin of the abscess be in a granulation-mass within the bone, the detritus will reach the surface of the bone by pressure atrophy, as well as by progressive destruction by tubercular inflammation and will attack in the same manner either the periosteum of the bone or the cartilage of the joint according as chance may have located the focus with reference to these tissues. If the periosteum is destroyed it is perhaps still possible that the joint cavity may be reached by local extension along the periosteum. This method of invasion is not demonstrable by reference to known examples, and is rendered less probable by the fact that the joint is enclosed within powerful ligaments which would present almost insuperable barriers to external attack. Usually, however, the periosteum is immediately perforated and the abscess passes into the soft tissues. Assuming that the disease has begun in the synovial membrane, the bone may be secondarily involved by the destruction of the cartilage and tubercular invasion of the surface of the bone or, the detritus having found its way out of the joint, under the periosteum, may dissect up that membrane for a distance and similarly destroy the bone surface, producing what is called superficial caries.

The direction taken by tubercular abscesses is of course that of least resistance. Assuming that the pus has originated in the joint cavity itself or, what amounts practically to the same thing, has found its way into that space before being effused abroad; it seems that both above and below the cleft of the joint the ligaments are so powerful that pus does not find its way through them. At any rate these ligaments in comparison with those at the front and rear of the joint are so much stronger that they are rarely if ever found to yield completely to the dissolving influence of the disease even when it is most advanced. Abscesses, then, leaving the sacro-iliac joint, are at once either intra-pelvic or extra-pelvic. Of fifty-five abscesses collected in Table II,¹ twenty-one or 38.2 per cent were thus extra-pelvic *i. e.*, made their way directly pos-

¹In some cases more than one abscess was noted:

teriorly—while the remaining thirty-eight, or 61.8 per cent, entered the pelvic cavity. The fate of these abscesses is still further seen in Table I.

Of the twenty-one extra-pelvic abscesses, eighteen found their way immediately to the surface, two dissected upward to appear in the lumbar region while a single abscess passed downward to the gluteal region.

Turning to the intra-pelvic abscesses, it will be readily seen that the situation of the ilio-psoas muscle immediately over the joint favors the passage of tubercular matter along its sheath to a very important degree. Thus four abscesses dissected upward to the lumbar region, while eighteen followed this muscle for a varying distance downward to lie embedded in the muscle sheath or to point near the insertion itself. The remaining twelve abscesses seemed to travel directly downward either, on the one hand, to pass out through the sciatic notch, some to point over the gluteus which has been perforated others to make their appearance on the posterior aspect of the thigh; or on the other hand, to perforate the rectum, the perineum or the anus.

Thus it will be seen that abscesses appearing immediately over the joint are invariably extra-pelvic. Those pointing in the gluteal region may be either extra or intra-pelvic, chiefly the latter. These may perhaps be best distinguished by the fact that the tumefaction in extra-pelvic cases is continuous (though not necessarily uniform) from the joint to the centre of the abscess; while in the cases in which the pus proceeds from the sciatic notch the external aspect of the joint presents no connection with the pus cavity. The abscesses in the lumbar region are to be distinguished as to their pelvic relations by the same procedure of tracing the pus pocket back to its point of origin.

The abscesses arising in the sacro-iliac joint and pointing in the femoral region, in the rectum, anus, perineum, or iliac fossa are according to these statistics invariably of intra-pelvic origin.

It is not necessary to enter here into a detailed account of the morbid processes which in these cases are responsible for the destruction of the various soft tissues that may be involved

—cartilage, ligaments, tendons, fasciæ, muscles, cellular tissue and finally the skin. Examples of the extent of such destructive action of the disease are not wanting in the table devoted to Pathological Anatomy.

It will be noted on the other hand that a part of the resisting energy of the patient is devoted to the production of osteophytes which at times are so extensive as to interfere with the functions of the pelvic viscera.

ETIOLOGY.—Velpéau¹ as long ago as 1862, noted that sacro-iliac tuberculosis was met “at all ages, in private and hospital practice, among the rich and the poor.” Somewhat difficult to account for is the fact shown in the following compilation, that children are not so frequently affected by the disease as older persons. Of thirty-two cases in which the age was recorded, there were of those

Less than five years of age,	-	-	-	-	3
Between five and ten,	-	-	-	-	2
“ ten and fifteen,	-	-	-	-	2
“ fifteen and twenty,	-	-	-	-	7
“ twenty and twenty-five,	-	-	-	-	12
“ twenty-five and thirty,	-	-	-	-	1
“ thirty and thirty-five,	-	-	-	-	1
“ thirty-five and forty,	-	-	-	-	1
45, 55 and 61, each one,	-	-	-	-	3

Thus less than twenty-two per cent of the cases were below fifteen years of age; the same proportion were between fifteen and twenty years of age; while in the fifth lustrum of life we find twelve cases recorded, just $37\frac{1}{2}$ per cent of the whole number. All the remaining years of life furnish only six cases, less than 19 per cent. The fact that traumatism of rather a severe nature has been recorded in so many cases would lead one to think that the disease occurred in those enabled by virtue of their vigor of years to engage in those pursuits in which violence was possible. It may be for this reason that children are so rarely affected. Prof. Sayre believes that traumatism is invariably an element in the etiology of the disease. A reference to his cases published in this article will do much toward inducing the reader to concur in this belief.

TABLE I.—PATHOLOGICAL ANATOMY.

No.	Observer. Where published.	Miscellaneous Information.	No. of Abscesses or Fistulae. Location.—Extra-Pelvic. Intra-Pelvic.	Bones. Cartilages.	Ligaments.—Synovialis.— Other soft parts.
1	Hahn, Ueber die sa- cro-cox- algie, Stutt- gart, 1833, Delens.	Autopsy.— Male, æt. 10. caries of lumbar ver- tebræ, bod- ies of 2d, 3d and 4th, left sacro-iliac disease.	Two abscesses connected together, joint full of pus. Pus passed through sciatic notch into buttock. Pus passed below iliac mus- cle toward anus.	Surfaces of bones of s. i. j. carious Cartilage destroyed.	Ligaments and muscles mixed with suppurating mass, difficult to distin- guish them.
2	Hahn, as a- bove, Delens.	Autopsy.— Male, æt. 20. caries of bodies of 3d, 4th and 5th lumbar ver- tebræ, with destruction of their car- tilages.		Separation of sacrum and ilium; latter two in. more elevated, its carious posterior extremity could be cut with knife, ca- ries of sa- crum in- volves the three false transverse superior apophy- ses as far as the fo- ramina, cartilage almost destroyed	Sacral nerves bathed in pus, muscles degenerated and infiltrated with pus.
3	Hahn, Ueber die sa- cro-cox- Stutt- gart, 1836. Delens.	Left s. i. d. Male, 25, an inward deviation of right thigh caused right knee to be carried un- der left.	Several blind fistulæ, con- gestion abscess on right, going from 3d lumbar vert. to lower extremity of rec- tum without osseous alter- ation. On left, abscess from Poupart under psoas to l. s. i. j. with degeneration of muscles, purulent tract from joint to tuberosity of ischium.	Symphysis ossified a- bove and behind, rest of ar- ticular surfaces denuded of cartil- ages and presents here and there ca- ries, sa- crum ca- rious be- hind.	Psoas degenerated.
4	Nichet, Gazette Méd. Delens.	Right side — Male, 18, complete destruction of cartilages 1st and 2d lumbar ver- tebræ, ne- crosis of 2d 3d and 4th lum. vert. died of per- icarditis.	Fistulous tracts extend from first lumbar vertebra to trochanter minor following internal border of psoas.	Cartilage of joint de- stroyed and bones play on each oth- er, sacrum much soft- ened.	Periosteum over anterior part of sacrum and s. i. j. elevated by mass of tuber- cular matter.

No.	Observ- er. Where pub- lished.	Miscellaneous	No. of Abscesses or Fistulae.	Bones.	Ligaments.—Synovialis.—
		Information.	Location.—Extra-Pelvic. Intra-Pelvic.	Cartilages.	Other soft parts.
5	Bulletin de Soc. de Chir. Mar. 18, 1857, Delens. M. Mor- el.	A phthisical woman had sacro-coxal- gic follow- ing ac- couchement			
6	Hulke, Trans. Path. Soc. of London vol. xiv p 208, 1863 Delens.	Child, pale and feeble, æt. 8 years. Abscess. Died of tu- bercular pe- ritonitis.	Abscess pointed and open- ed spontaneously, 4, mo. before death, in buttock near great trochanter, fis- tula ended in little cavity, in post. inf. spine of ilium and up to lateral masses of 4th and 5th sacral vert.	This cavity contained a very small free sequestrum from 4th piece of sacrum Joint was full of pus which de- pended on necrosis.	Remains of softened carti- lages still clung to articu- lar surfaces.
7	Courty, Ar Bos- sin Dic. of Med. in thirty vol. T. V	Male. æt. 17. Died of in- termittent fever, R. s. i. d.	Pus diffused. 1. In front of pyramidalis, as far as sci- atic notch and side of right iliac muscle. 2. Mounted up psoas to lev- el of 3d lumbar vertebra.	Tolerably manifest alteration of anterior face of sac- rum.	
8	Stoll, Delens, R. s. i. d.	See Clinical History. Pulmon- ary phthisis	One abscess. Extra-pelvic.	Articular surfaces carious.	Intra-articular ligaments destroyed. Soft parts, cel- lular tissue, etc, in yel- lowish white mass which maintained bones in con- tact.
9	Observ- ation of Larrey. These de Hat- tute, Paris, 1852, Delens, R. s. i. d.	Hip joint and spine sound	1. Started from sciatic notch and occupies region be- neath gluteus maximus. 2. In sheath of psoas and iliacus testid pus. 3. Abscess over s. i. j.	Bones could be easily separated from one another by pres- sure. Tis- of 2 bones is friable, soft and infiltrated with pus. On sac- rum caries extends at several points to the spinal canal; in ilium it extends above two finger breadths outside of joint.	Muscles below the subcuta- neous abscess of the glu- teal region and the psoas and iliacus are softened and infiltrated with gray- ish pus. Post sacro-iliac ligaments anterior and su- perior completely destroy- ed, were sought for, but no traces found. The post. vert. ligament, converted into jelly, was detached from its iliac insertion. Periosteum dissected up for two finger breadths beyond joint, both on ili- um and sacrum.

Observ- er. Where pub- lished.	Miscellaneous Information.	No. of Abscesses or Fistulae. Location —Extra-Pelvic. Intra-Pelvic.	Bones. Cartilages.	Ligaments. — Synovialis. — Other soft parts.	
10 Obs. of Weiss. These de Hat- tute, Delens, R.s.i.d.	See Clinical History, No. 10, tubercular cavities in lungs, tubercular ulcers in intestines.	Large abscess below gluteal muscles communicates with pelvic cavity by s.i.j. open behind sciatic notch. 2. Purulent depot in iliac fossa. Iliac fossa stripped up, s.i.j. opened, pus extending down to middle of thigh and upward to 10th dorsal vert. whose transverse process is slightly carious.	Articular surfaces of sacrum and ilium are profoundly carious.		
11 Bul. de la Soc. Ant. 38, p. 221, Delens, Sequestum.	See Clinical History, tubercles in right lung.	1. Abscess of buttock of two pockets; one subcutaneous, superficial, other sub-muscular, communicating with one another across frayed fibres of partly destroyed gluteus maximus. 2. Pocket in front of s.i.j. extending from base of sacrum to edge of 4th ant. sacral foram. embracing the four corresponding sacral nerves. Joint perforated by abscess.	Ex. surface of il. denuded and carious over a circular extent of five cent. diameter. In pocket 2 some pus with a little sequestrum completely detached; surfaces of bone carious and irregular. This change in the sacrum extended to the whole part corresponding to the 4 ant. sacral foramina, on the ilium, the whole articular surface and some centimeters around. The most advanced part is at upper part of joint. Osteophytes in front of joint are large.	Great sciatic nerve is separated only by a slight layer of grayish matter explaining sudden pain caused by injection. In joint, no carilage, no synovialis, no superior and anterior ligaments. Interosseous ligaments easily divided and hence altered.	

No.	Observer. Where pub- lished.	Miscellaneous Information.	No. of Abscesses or Fistulae. Location.—Extra-Pelvic. Intra-Pelvic.	Bones. Cartilages.	Ligaments.—Synovialis.— Other soft parts.	
12	Obs. of Gour'ud Thesis of Bois- sarie, '62 Delens, L.s.i.d.	See Clinical His. No. 12. Other or- gans sound.	1. Vast burrow divided in two parts by gluteus maximus, one superficial, the other deep, passing under aponeurosis of sacro-lumbalis and long dorsal muscles. This communicated with s.i.j. by an orifice between sac. and il. at iliac spine, which is denuded and rough. 2. On both sides in psoas were circumscribed abscesses without communication with neighboring parts. 3. Small pocket on anterior face of sacrum, between 2d pair of sacral foramina; another pocket over a carious spot in sacrum.	Articular surfaces covered with bleeding fungosities in mid-st of which were bone fragments necrosed or carious		
13	Obs. of Gadaud Bul. de la Soc. Anat. 1865. Delens, L.s.i.d.	See Clinical His. No 13	In internal iliac fossa much pus. S.i.j. full of pus.	Section of sacrum shows an abscess with in it separated from s.i.j. only by a very thin layer of bone. Bones were altered. Fibrocartilage destroyed.	Atrophy of muscles of affected side. Commencing degeneration. Nothing in vessels. Tuberculosis of lumbar glands.	
14	A. Bou- naix. These de Paris 1874, R. s.i.d. Phthisis pulmo- nalis.	See Clinical History No. 14. Right lung, ex- tensive tu- berculosis; left lung less exten- sive. On left deep mus- cular veins full of black coagula, which do not pass the point of emptying in to internal iliac. No phthisis.	Pus in psoas muscle follows it and goes to trochanter minor where there is a pocket. S.i.j. full of pus which also runs into length of pyramidalis, passes through sacro-sciatic foramen into gluteal muscles.	Ilium denuded quite extensively over ant. face. Femur denuded about the trochanter minor.	Right iliac fossa, psoas contains pus pocket at the level of 3d lumbar vertebra. Pus had run along fossa, denuding the ilium as far as crista ilii. Fatty degeneration of muscle around fistulae.	

No.	Observer. Where pub- lished.	Miscellaneous Information.	No. of Abscesses or Fistule. Location.—Extra-Pelvic. Intra-Pelvic.	Bones. Cartilages.	Ligaments.—Synovialis. — Other soft parts.
15	A. Bou- naix, as above. L.s., d.	See Clinical History No. 15. Right joint sound. No tuber- cles in lungs	Sheath of psoas of same side full of pus down to tro- chanter minor. At level of s.i.j. pus breaking out of joint has perforated the gluteus max. and skin. 2d abscess pocket arises from altered bone at level of left branch of pubic bone. This follows the sheath of the femoral vessels and directs itself towards the internal part of femur opening at back of thigh thus enveloping the sci- atic nerve.	Bony sur- faces of s. i.j. deep- ly carious. Perios- teum of ilium and femur over- grown with oste- ophytes. Two large ones along psoas.	Pus pocket in right side of psoas.
16	A. Bou- naix. These de Paris 1874, R. s.i.d.	See Clinical History No. 16. Lungs riddled with tubercles. Hip—Vast collection of pus at external part of thigh. Cap- sule open behind and communi- cating with this pocket. Head of fem- ur exten- sively dis- eased.		Ilium denu- ded in a line ex- tending from pos. sup. spine of ilium towards cotyloid cavity, where perios- teum is elevated and bone shows ap- pearance of "rari- fying os- teitis."	Ilio-sacral ligaments partly destroyed. As to s.i.j. the cartilages were softened and had undergone the commencement of de- struction, but there was no suppuraton.
17	Tilling, St. Pe- tersbur- ger Med Woch. July 23, 1883. Opera- tion. Seques- tra.	See Clinical His. No. 17. M. Patho- logical con- dition of in- testines not mentioned.	The abscesses present are described under the head of clinical history.	Bones showed extensive osteopo- rosis of ilium, nu- merous sequestra and slight formation of osteo- phytes. Tuberosi- ty of ilium almost gone; had been re- moved by eviden- ment and of course with it the articular surface.	

No.	Observ- er. Where pub- lished.	Miscellaneous	No. of Abscesses or Fistulae.	Bones.	Ligaments.—Synovialis —
		Information.	Location.—Extra-Pelvic. Intra-Pelvic.	Cartilages.	Other soft parts.
18	G. Til- ing, St. Peters- burger Med. Woch. July 23, 1883, L. s.i.d. Opera- tion.	See Clinical History No. 18.M. Acute tuberculosis of both lungs. Su- perficial car- ries of ant. surface of sacrum, 5th and 4th lumbar vert. and left lat- eral surface of sacrum, condition of intestines not men- tioned.	A large sub-gluteal abscess was found at the opera- tion. This was found com- municating with a large cavity in the hollow of the sacrum by way of the sacro-sciatic notch.	The Tuber- osity of the ilium was al- most com- pletely gone hav- ing been removed at the op- eration as also post sup. part of sac. sci- atic notch.	
19	J. B. Mustin L.s.i.d.	See Clinical history.	Large cavity with a firm wall on dorsum of ilium, occupying place of gluteal muscles. Another in iliac fossa was connected with first through sacro sciatic notch and also in front.	The ilium and sa- crum were "honey- combed" especially the sa- crum.	On left side iliac vessels im- bedded in the pseudo- membranous mass of iliac abscess. Artery was not diseased. Vein much shriveled, contained a clot. Vena cava below the renal veins occluded by a clot, which extended into right as well as left iliac vein.
20	Dr. Ma- son, N. Y. Med. Record. Dec. 25, 1875. R. s.i.d.	See Clinical history.	Abscess passing down be- low Poupart's ligament.	Extensive erosion of bones with de- struction of the lig- aments.	
21	L. A. Sayre, Orth. Surg. 1883, p. 353 Double s.i.d.	4. M. See Clinical History Coxa healthy.	Extensive abscesses down psoas muscles, on left [1] passing out above Pou- part's ligament; on the right [2] passing below and down thigh.	Extensive caries at both s.i. joints.	
22	Dr. Sat- terth- waite, Med. Record, May, 26, 1877.	34. M. Re- mark. There had been no pain on approximat- ing the ilia and no ten- derness over s.i.j.	Extensive abscess down- ward and backward from the crest of the ilium to the spine, which was car- ious.	A small car- ious spot was found upon the opposed surfaces of the sa- crum and ilium.	

TABLE II. *—STATISTICS OF ABSCESES IN SACRO-ILIAC TUBERCULOSIS.

Extra-Pelvic.	Pointing posteriorly.—18 Abscesses—(i. e. immediately over the joint).	Nos. 44, 1st; 45, 1st; 9, 3d; 53, 1st; 15, 2d; 44, 2d; 8, 10, 1st; 11, 1st; 13, 1st; 14, 48,....; 52, 2d; 53,....; 17,....; 18, 1st; 55,....; 56,....; 58,....	
	Dissecting upward (pointing in lumbar region).—2 Abscesses.	No. 43, 2d; No. 57.	
	Dissecting downward (pointing in the gluteal region) — One abscess.	No. 43, 1st.	
Intra-Pelvic.	Dissecting upward to lumbar region.—4 Abscesses.	Nos. 4; 7; 10, 3d 59, 1st.	
	Dissecting outward and forward.	Under periosteum.	No example at hand.
		Under ilio-psoas.	Without finding exit anteriorly: 7 abscesses. Nos. 3, 11, 2d; 12, 13, 2d; 49; 50; 51, 2d. Toward insertion of ilio-psoas: 11 abscesses. Nos. 3, 4, 10, 2d; 45, 14, 1st; 15, 1st; 54, 21, 1st and 2d; 20, 59, 2d.
	Dissecting directly downward.	1. Out through sciatic notch.	Through gluteus. 5 Abscesses. Nos. 1, 1st; 9, 1st, 14, 2d; 18, 2d; 19. Downward to thigh. Nos. 44, 3d; 6; 7.
		2. Inward toward ischio-rectal fossa to	Rectum: Nos. 45, 2d; 2. Perineum or anus: Nos. 1, 2d; 9, 2d.

* The numbers refer to the record of cases in the other tables.

Closely associated with the idea that traumatism is an important factor in the causation of the disease is the fact that the occupation of many of the adult patients has been such as to favor violence. Thus several of the victims of the disease were gunners, accustomed to ride on jolting caissons. Some of the women were laundresses. And the children affected were chiefly those addicted to violent sports.

Sex as an element in the etiology, seems on account of exposure to traumatism to favor the development of the disease in the male, if we except the especial liability to the disease of parturient women.

To determine the relation of these factors even approximately would require a much greater number of recorded cases than are as yet at hand.

SYMPTOMS, COURSE, DURATION.—The classification of symptoms published by Erichsen in 1859 was so convenient on account of its adherence to the succession of clinical phenomena that it has served as a model for almost all the writers who have since studied the disease. Erichsen regards the chief symptoms as five in number—pain, lameness, changes in attitude and length, tumefaction and abscess.

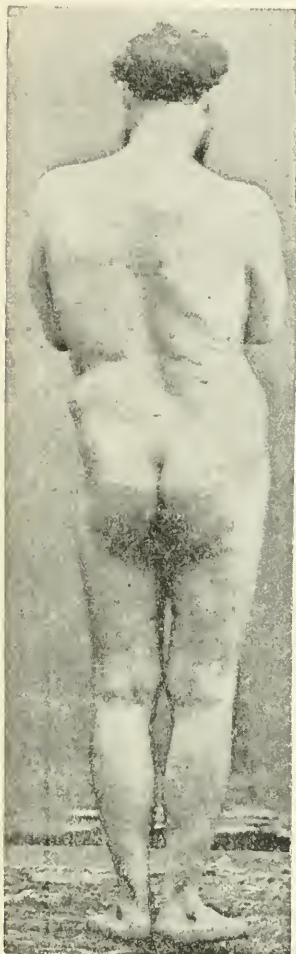
The pain¹ varies in character, intensity and seat, and differs in these respects with the period of the disease. "One of the earliest symptoms," says Erichsen,² "is a sensation of painful weakness at the lower part of the back and sacrum increased by movements of the body in walking, stooping, or even in standing, giving the sensation as if the body were falling asunder." Chouppe observed that the discomfort caused by movements rendered the patient lazy. But not only movements are painful, but even the maintenance of the sitting or standing posture.³ Indeed, when the disease affects both joints, M. Duplay observed that the patient could not sit up at all. Conversely, however, when the patient lies down for a time and thus completely rests the joint, pain disappears—at least at the beginning of the disease. Though at first the pain is intermittent or even fugitive, coming on only after exertion, it usually becomes after a time constant and severe. Lifting heavy bodies becomes impossible and soon the patient cannot sustain his own weight. When abscesses have formed the pain is usually worse than before though it is generally somewhat relieved by removal of the fluid.

¹Delens, *De la Sacro-Coxalgie*, p. 46.

²Braithwaite's *Retrospect*, Part 39, 1859.

³Johnstone, in *Holmes' System of Surgery*.

The seat of the pain is by no means constant. Delens¹ makes the important statement that "Spontaneous pain always



ROF. SAYRE'S CASE.—REV K., SHOWING POSITION CHARACTERISTIC OF SACRO-ILIAC DISEASE.

exists to a certain degree at the level of the articulation, or at least it can be made to occur there by external pressure, or by pressure through the rectum, the finger being carried to the level of the symphysis."

Pressing the ilia towards one another produces usually the symptom of pain in the sacro-iliac joint, which is almost pathognomonic. Lying on the affected side is usually impossible on account of pain caused by pressure upon the joint. Pressure on the greater trochanter does not cause pain if the pelvis is steadied and carefully supported. The pain may not be confined to the region of the joint and of the buttock, but may extend to the anus and the leg. This may be on account of pressure from an abscess on the nerve trunk, as in the case of M. Guéniot, in which the sciatic nerve was pressed upon by a pus pocket. In some cases, as noticed by Langier, Hilton and Velpeau, the pain extended even to the knee.

From the fact that pain is occasioned by movement, lameness naturally follows—usually worse toward the close of a day's activity. As Gosselin² has pointed out, the gait is usually in

¹De la Sacro-coxalgie, p. 47.

²A. Bounaix, Thèse de Paris, 1874.

small steps, since more extended ones involve the joint by calling the pelvis into action, and cause severe pains. On account of the habit of walking with the greater part of the weight thrown on the sound side, the pelvis is habitually tilted and from this results the "position hanchée" of Hattute. Prof. Sayre regards this position as characteristic, and has kindly sent me a photograph of the case of the Rev. K. illustrating it. (Fig. 1).

Stoll observed a dragging of the affected limb. The point of the foot does not usually deviate (though there are exceptions) and Hahn attaches much diagnostic importance to this symptom. From the fact that in locomotion the arc is diminished in which the leg swings, the muscles concerned in the act are atrophied to a greater or less extent depending on the duration and severity of the disease. In this way the buttock comes to have a flat appearance.

Such alterations in the size and shape of the limb are far more real and important than the changes supposed to occur in its length. This branch of the subject was given undue prominence in a former generation by Hahn, who, influenced by prevailing ideas on *morbus coxarius*, admitted a lengthening of the limb in the second period, followed by a shortening at the commencement of the third or the end of the second, occasioned by changes in the relation of the ilium to the sacrum. The investigations of Broca have strongly influenced the students of the disease and Delens¹ goes so far as to say that he regards these changes as always apparent and they are due, as in *morbus coxæ*, to vicious positions which the pelvis takes itself, or to movements of torsion or flexion which take place in the lumbar column. This view is strengthened by the fact that the massive ligaments of the joint yield completely to the disease only in the most advanced stages and most severe forms. Moreover, the symphysis pubis always remains as a support and would prevent any considerable displacement. And as the displacement must be slight in degree, statistics of mensuration will always be questionable

¹De la Sacro-Coxalgie, p. 51.

since our landmarks are not capable of accurate mathematical location.

The swelling overlying the superficial aspect of the joint, though not always present, is, when found, a valuable diagnostic point. The intumescence is usually somewhat elongated from above downward but, until suppuration has occurred, the area involved in the swelling is not great. Rectal touch is useful in determining the condition of the anterior aspect of the joint.

The symptoms of abscess formation fortunately do not occur in all cases. If they are noted at all they occur in the later stages of the disease. The evidence of the occurrence of abscess consists in a more or less gradual increase in the dimensions of the tumefaction accompanied by bogginess at first and terminating in fluctuation. The points at which abscesses make their appearance and the various directions that they may take have already been referred to.

Another symptom of importance was noted by Johnstone in Holmes' System of Surgery—local elevation of temperature over the joint. Prof. Sayre has utilized this phenomenon in making diagnoses, with satisfactory results.

From such an account of the symptoms that may occur it will be seen, I believe, that the most natural and convenient division of the course of the disease consists in its consideration in two stages—the first embracing the phenomena before, the second, those after the formation of abscesses. Hence the second stage is often absent.

The beginning of the disease is insidious. Often without being preceded by a trauma sufficiently severe to attract the individual's attention, the patient will notice a feeling of discomfort at the close of days of activity and perhaps a slight pain in the hip or knee. In a few days, increasing pain and lameness admonish him to consult the surgeon, who finds tenderness and swelling over the joint, together with a slight local rise of temperature. Without appropriate treatment the symptoms become more pronounced, the patient soon finds himself unable to walk about, and after some months is confined closely to his bed, though in one of Bounaix's cases the patient could walk about, even with a drainage tube in his buttock. Then it is

that abscesses make their appearance, ushering in the second period of the disease, and usually increase in size until they find their way to the outside air, or into a hollow viscus. Once mixed infection has occurred the patient begins to suffer from sapræmia and either with or without true septicæmia comes to his death. Concomitant and incidental diseases of the viscera, however, carry off perhaps a larger proportion of the patients than the causes just mentioned.

DIAGNOSIS.—The diagnosis of tuberculosis of the sacro-iliac joint implies not only the exclusion of diseases in neighboring structures but also the exclusion of other pathological processes within the joint itself. As has been already suggested in this paper, the sacro iliac joint is liable to many of the forms of inflammation that occur in other joints, namely, the various forms of suppurative inflammation, acute and chronic, primary, metastatic and osteomyelitic, as well as gonorrheal rheumatism, acute articular rheumatism and arthritis deformans. Though they probably exist, examples are not at hand to demonstrate the occurrence of the arthritis of tabes, of syphilis or of gout. Besides the inflammations, Delens, and following him, Bounaix have suggested the propriety of excluding cancer, fibroplastic tumors, enchondromas and hydatids. But as no observer has as yet recorded any difficulty in the exclusion of these diseases their introduction is based on purely theoretical considerations. A syphilitic or gouty inflammation would require exclusion by a recognition of characteristic lesions elsewhere or by the history of the case. The same might be said of arthritis deformans and of the various forms of rheumatism. But in the acute forms of rheumatism the element of duration will materially assist in the diagnosis. Moreover the tenderness in rheumatism is generally much greater than in tuberculosis. The suppurative lesions are distinguished readily by the very fact of suppuration, the question of an addition of suppuration to tubercular inflammation being excluded by the history of the case.

But it is in the exclusion of the diseases of parts entirely foreign to the joint that the greatest difficulty arises. By dividing these diseases into three classes according to the lucid

arrangement of Delens the obscurity is much relieved. These classes are

1. Neuralgic affections.
2. Affections of muscles.
3. Affections of bones and neighboring joints.

The painful affections of the large and numerous nerve trunks of the lumbar and pelvic regions are more frequently substituted, diagnostically, for tubercular disease of the sacro-iliac joint than *vice versa*, e. g., Prof. Sayre's case of Rev. K., in which two eminent New York surgeons overlooked the disease in the joint and diagnosticated inflammation of the sheaths of the lumbar nerves. Lumbo-abdominal neuralgia must be distinguished by careful reference to the painful points of Valleix as well as by attention to the resemblance to other forms of neuralgia. The very common neurosis, sciatica, is frequently regarded as the cause of pain which in reality is due to sacro-iliac disease. It is to be remembered that sciatica generally occurs in older persons than sacro-iliac disease; that in the former malady, the pain runs down the leg, while in the latter it is confined to the joint; and that in the former the pain is constant and, a point especially important, is not relieved by rest. But the surgeon will recall the possibility of sciatica co-existing with the joint disease. Moreover, the sciatic nerve may, as in Gueniot's case, be directly involved in the disease so that pain is felt, even more severe than that of sciatica.

Of the group of diseases implicating the muscles about the joint lumbago is the most common. In it the tenderness is found to be greatest over the lumbar region and not over the joint. In lumbago, also, the pain is not confined to one side of the spinal column and is called forth by flexion and extension of the trunk. Of course the symptoms characteristic of the sacro-iliac disease other than pain are wanting. Affections of the psoas muscle are specially associated with flexion of the thigh on the pelvis with inward rotation of the foot. This sign¹ is almost pathognomonic; at any rate it has never been observed in sacro-iliac disease. In psoitis there is no pain at the

¹Delens, "De la Sacro-Coxalgie," p. 65.

posterior part of the joint nor does lateral pressure on the pelvis produce pain.

The affections of the bones composing the joint or lying close to it are, perhaps, when associated with abscess formation, most difficult of exclusion. A diagnosis is to be reached by a careful search for positive symptoms of joint involvement, and failing in finding them, a thorough examination is to be made with reference to the origin of the disease in the bones themselves. If fistulæ are present, the diagnosis may be facilitated by their exploration.

Tuberculosis of the vertebræ is to be excluded by the absence of tenderness over the spinous processes, and the numerous other positive symptoms of Pott's disease. It is only when this disease occurs in the lumbar vertebræ or is associated with abscess formation that the diagnosis is confusing. It is then to be decided by the local symptoms of tenderness, elevation of temperature over small areas, and tumefaction. In disease of the vertebræ the patient would use both limbs alike, so that the symptom of lameness would be absent. In all efforts to obtain a diagnosis we must not neglect the attempt to elicit pain by the pressing of the ilia toward one another.

The presence of this symptom, together with the absence of pain on moving the thigh when the pelvis is steadied, will exclude morbus coxarius. Indeed the writer would suggest that a search for the symptom of pain on pressing the ilia together be adopted as a part of the routine in the diagnosis of morbus coxarius, for the exclusion of sacro-iliac disease, since in his opinion the majority of cases in which failures of diagnosis were made depended not so much on the inherent obscurity of the disease, its lack of characteristic symptoms, as on a hasty and over-confident diagnosis of the familiar and often somewhat obscure tuberculosis of the hip-joint. In addition to this point are to be noted the difference in attitude of the two diseases, the different forms of lameness, the occasional tenderness by rectum of the anterior aspect of the sacro-iliac joint in the one disease, of the acetabular region in the other, and in the abscess forms of the disease in the usually obvious difference in the origin of the abscesses.

TREATMENT.¹—The diagnosis of sacro-iliac disease was among the earlier observers of the malady, that is, from 1821 to 1859, on a rather uncertain footing, and was chiefly confined to a recognition of the disease in the stage of suppuration. The treatment of the disease was not likely to have been carefully formulated in the earlier stages when the earlier stages themselves were generally unrecognized. But the symptoms of the disease, though not recognized as belonging to sacro-iliac tuberculosis, were treated in that vigorous way in which the same manifestations were combated in other and well diagnosed ailments. The surgeons of that day were masters of the use of counter-irritants, frictions with liniments, painting with various drugs, application of cups, leeches, moxas and setons, production of blisters, the acupuncture and the actual cautery. These were used empirically by all who were puzzled by the vague symptoms of the disease in the early stages, as well as advised by those who had diagnosticated their cases in the beginning. Erichsen who, in 1859, may be said to have represented the earlier students of this subject—Boyer, Velpeau, Larrey, Langier, Frère, Girauld de Nolhac, Delineau, Joyeux, Maisonneuve, Nélaton and Gurlt—formulated very briefly the principles of treatment as follows: "The treatment must be conducted on the same general principles that guide us in the management of cases of carious disease of the spine. Rest in the prone position; counter irritation in the earlier stages before suppuration has set in—after that has occurred this is worse than useless—opening abscesses, when large and chronic by valvular incision, and keeping up the powers of the patient, are the means that must be had recourse to, but usually unfortunately, with little advantage beyond the mitigation of suffering and the prolongation of life for a limited time. I need hardly say that operative interference is not admissible here."

This plan of treatment begun without hope, ended, as Erichsen regretfully confessed, without success. For although rest in the prone position was recommended, it was carried out, not

¹A portion of the ideas expressed in this section were advanced at the meeting of the American Medical Association, May, 1888.

rigidly and with mechanical accuracy, but with an apathy clearly indicating a lack of appreciation of its value. But while they advocated rest they positively forbade operative interference, and that too, as indicated by the quotation from Erichsen, in a way that precluded opposition.

Prof. Sayre has kindly referred me to the record of a case occurring in his practice six years before this dictum of Erichsen's, that was treated in a manner directly opposite to that advised—so far as operation is concerned—and with a result equally refreshing. The case occurring at that early date—1853—deserves to be given in detail. Indeed it is a matter of regret that it was not published at the time.

CASE 57. A. M. S., æt. $2\frac{1}{2}$ years, fell behind a trunk in the autumn of 1852. Some months after he had an abscess in the lumbar region which was opened by a valvular incision by Drs. Parker and Mott. In a few weeks it refilled and was again opened by a valvular incision by Drs. Parker and Mott, and partly emptied. Hectic symptoms supervened, and the patient was sent to the country where he grew rapidly worse and became greatly emaciated with hectic fever and loss of appetite. I was sent for to see him in the country, as he was thought to be dying. In September, 1853, I had urged Drs. Mott and Parker to open the abscess by a free incision at each of the former operations; but they said it would be fatal. The father of the child knowing the different opinions of myself and Mott and Parker, told me that as the child was dying and the former operations had done him no good, to do as I liked with the case. I immediately made a free incision of three or four inches in the line of the sacro-iliac junction and gave exit to a large amount of pus and sloughing connective tissue was pulled away by the forceps. The sacro-iliac joint was distinctly open and denuded of its articular cartilage, roughened bone being felt, both on the ilium and sacrum. Not having anything but my small pocket-case of instruments with me, I took a large and curved knife which the grand-father had for pruning trees, and with it scraped and removed all the carious bone that I could reach. The wound was filled with Peruvian balsam and stuffed with oakum.

"That night the child slept well, and in the morning was better than he had been for months, and ate freely for the first time in some weeks.

"From this time he went on to rapid recovery, the wound being dressed daily and packed with oakum and Peruvian balsam to the bot-

tom until it granulated firmly and healed perfectly in about three months.

"He grew to be a strong and vigorous man, was a civil engineer of great energy and activity, was always in perfect health until at the age of 32 years he fell from a roof of a house and was wounded in the foot by a nail. Lockjaw ensued and the man died."

This, the earliest case, so far as I can ascertain, in which *évidence* was practiced, not having been published, exercised no influence on the practice of surgeons in general in such cases until the *Orthopedic Surgery* of Prof. Sayre was published a few years later.

Two of the remarkable cases of Hilton had come under the care of that distinguished surgeon in the same year as that of Sayre, viz., 1853. These cases together with two others occurring in 1857 and 1861 respectively, were not made public, except perhaps in his clinical lectures, till the celebrated work on "*Rest and Pain*" was published some years afterward. The application of complete mechanical rest was one of the most valuable lessons taught in the pre-antiseptic era, and was perhaps most strongly inculcated by Hilton.

But the recognition of the need of avoiding mixed infection was manifest in the advice of Erichsen, who only voiced the sentiment of other surgeons in declaring that incisions should be valvular. Later on the aspirator was used quite extensively. Many operators, however, fell into the error of using only a small valvular incision in cases where mixed infection had already occurred. One surgeon even closed up with collodion a fœtid abscess that had opened spontaneously. But in almost all cases a free incision was promptly made where the abscess became fœtid.

Delens, in 1875, formulated the treatment adapted to three stages of the disease. In the first of his divisions—where only pain and lameness were present—he recommended the relief of pain by the use of chloroform liniment with friction and by the use of morphia. Rest was to be carried out by the dorsal decubitus in bed; and if the patient rose up he was required to use crutches and a pelvic bandage. In case

of women recently confined, great care was enjoined, a pelvic girdle being used and prolonged rest required.

Bogginess and swelling initiated, with Delens, the second set of indications, requiring revulsives from tr. iodine and fly blisters to the red-hot iron. Delens mentioned Larrey¹ as authority for moxas, avoiding bony prominences. Immobilization was to be secured by means of M. Verneuil's apparatus embracing the pelvis and applied to the affected limb.

It is at this point that Delens² takes occasion to condemn operative interference except for the extraction of sequestra.

After suppuration has occurred he recommends, in cases where necessary, aspiration, puncture with the trocar, opening by means of Vienna paste, or drainage and injection of tr. iodine after the manner of Chassaignac in other joints. Delens does not neglect, however, to remind us of two cases of M. Velpeau which died after opening, on account of secondary infection.

Adrien Bounaix,³ in a rather long thesis, devotes himself chiefly to the reporting of four new cases rather than to a discussion of the modes of treatment. He recommends rest by fixation; forbids opening of abscesses, if it is avoidable, but demands drainage if the opening is made.

In a clinical lecture of 1876, Christopher Heath⁴ says that operating is a very serious matter indeed. He discountenances the use of the extension but recommends a pelvic belt.

Poore, in his article on sacro-iliac disease in 1878,⁵ does not add anything to the subject of treatment.

In 1879, Prof. L. A. Sayre⁶ advises in the early stage leeching, the ice-bag,—then counter-extension and the actual cautery, if there is much pain. If it is advisable to use fresh air treatment, he advocates the use of a shoe with the heel and sole higher on the sound side.

¹(Clinique Chirurgicale, III, p. 330).

²Delens, "De la Sacro-Coxalgie," p. 82.

³Contribution a l'etude de la Sacro-Coxalgie. Thèse de Paris, 1874.

⁴Brit. Med. Jour., Vol. II, p. 781.

⁵Am. Jour. Med. Science, Jan., 1878.

⁶N. Y. Med. Record, Feb. 15.

John Wood¹ recommended counter-extension and double extension, that is, the application of an equal weight to each leg. He regards unilateral extension as useless and injurious.

Dr. G. Tiling² details the operative treatment adopted in two cases which nevertheless terminated fatally. His valuable remarks will be referred to again.

F. J. Gant³ published last year an account of two cases in which operative interference was successful.

Recovery may take place in local tuberculosis at the sacro-iliac joint, as in local tuberculosis elsewhere, after the spontaneous removal of fluid or solid detritus through the aid of the surrounding healthy tissues; after the partial resorption of the detritus and the encapsulation of the remainder (as may occur when sequestra are present); or after complete discharge of tubercular matter externally. In either case healing takes place by the formation of a cicatrix from the granulation tissue about the periphery of the focus. If, then, recovery only takes place after the tubercular detritus is thus disposed of, we conclude readily that the smaller the amount of detritus to be removed the more favorable, *cæteris paribus*, will be the case for recovery. Such is the fact. For after cold abscesses have formed, the percentage of recoveries is much smaller than when no abscesses are present. But this fact is due not only to the large amount of detritus present, but also to the invasive character of the disease, its tendency. When the tendency of the disease is toward resorption and scar-formation, recovery is to be expected. The elements active in determining this tendency are as yet undemonstrated. Koenig has long ago distinguished between a "dry, granulating form" tending to recovery and a "moist form" in which coagulation-necrosis is rapid and peripheral extension is progressive. In our study of the pathology of the disease we have already seen that the original nature of the disease, as regards manner of infection, has much to do with the extension or the limitation of the dis-

¹British Medical Journal, June 5th, 1880.

²"Ueber Erkrankung des Ileo-sacral-gelenkes." St. Petersburger Medicinische Wochenschrift, July 23, 1883

London Lancet, September, '87.

ease. But since in the sacro-iliac joint we are as yet unable to determine whether the local disease is a "granulation-mass" form, a wedge-shaped sequestrum form, or a primary tubercular synovitis, we are compelled to utilize as a prognostic symptom the fact that cold abscesses are or are not present. This fact, easily determined as a rule, gives also the chief indication for treatment.

For a reference to the table of cases in which abscesses did not occur, readily discloses the fact that sixteen out of the seventeen cases which were kept under observation till they terminated, resulted in recovery. The case that died was lost on account of an old hip-joint tuberculosis that completely obscured the disease of the sacro-iliac joint. This is 94 per cent of recoveries.

On the other hand, among thirty-eight cases in which abscesses occurred only three recovered without operation, that is, 7.9 per cent. The tendency of the disease is thus readily seen to be strongly unfavorable to life in the moist form; while in the form in which dry granulations persist throughout the course of the disease the prognosis is favorable. A natural division of therapeutic measures as well as an obvious classification for diagnostic and descriptive purposes follows from these facts.

For, if recoveries amount to 94 per cent. of all the cases in which no abscesses form, we certainly have reason to be satisfied with whatever measures of treatment have contributed to that result. And, since we know that cases in which the disease exhibited a dry form in the beginning may, at a later period, exhibit cold abscesses, we must adopt all possible means to prevent such a termination.

[To be Continued.]

ON AMPUTATION OF THE ENTIRE UPPER EXTREMITY IN THE CONTIGUITY OF THE TRUNK BY THE METHOD OF PAUL BERGER: WITH TWO CASES OF THE OPERATION.

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IT is rather surprising that no method of amputating the entire upper extremity, that is of the arm with the scapula and more or less of the clavicle should be described in our treatises on operative surgery. Though mainly to be explained by the comparative infrequency of the procedure, it is probably due in some measure to the want of any accepted or recognized mode of performing the operation, and may cease to be the case with the establishment of better known and regulated principles.

With this object, M. Paul Berger has recently published his treatise, a large one, on this one amputation (*L'Amputation du membre supérieur dans la contiguïté du tronc*. Paris: 1887.)

The work is based on a full critical revision of all the literature and reported cases, on numerous experimental observations on the dead subject, and on the experience of a case of his own. The method he advocates is a decided advance on what has hitherto been done, combining the greatest security against accident with a well arranged order of procedure. The operation is performed in two stages, the first of which includes the treatment of the large vessels, the second fashioning the flaps and removing the limb.

I adopted it in the two following cases which were under

my care in the Queen's hospital within a few months of each other, and which I think are the first of the kind.

The description of the operation is, as nearly as possible, Berger's own :

CASE I.—F. S., female, æt. 21 : was brought to me by Mr. Cooke, of the Parade, in May, 1887, on account of a large growth of the upper end of the humerus. The tumor, which was of firm consistence and as large as a cocoa-nut, lay under the deltoid and englobed the articulation, though leaving its movements fairly free.

There was another large secondary tumor in the axilla, quite movable over the wall of the thorax.

The disease was of nearly two years' duration, and the general health but little injured.

I was anxious to amputate at once, but the parents would not hear of it, and a further month elapsed before the terrible increase of suffering induced them to welcome anything which offered a prospect of relief. Unfortunately by this time another nodule had appeared in the fossa above the clavicle. It was, however, isolated and movable, and appeared to represent the limits of the disease.

Operation.—First Stage: Resection of middle third of clavicle.—The arm being brought down to the side, an incision commencing one inch outside the sterno-clavicular joint was carried along the clavicle to its external end. The periosteum was then raised by elevator from that part of the bone between the attachments of the rhomboid and coraco-clavicular ligaments, and the denuded portion removed by the saw.

Second stage—Securing the vessels.—The previous step exposes the subclavius muscle in a fibrous sheath. These are to be cut across and the upper border of the pectoralis minor defined, while the cephalic vein and any branches of the acromio-thoracic artery which interfere may be ligatured and cut. In searching for the artery (subclavian) I found a guide recommended by Berger, viz., the external anterior thoracic nerve, serviceable. This nerve is so prominent that it can hardly escape observation, and if followed upward, it leads to the interval between the artery and vein.

The artery having been cleared for a sufficient distance, I applied two silk ligatures, rather more than half an inch apart, and severed the vessel between them. The vein was then served in a similar manner. This required to be done with more care and delicacy than in the case

of the artery. Before tightening the ligatures on the vein the limb was held vertically for two minutes to empty it of blood.

The supra-scapular vessels which cross the upper part of the wound were next cut between two ligatures.

It will be seen that the operator is now secure against hæmorrhage from both the proximal and distal ends of the artery and the vein, and that there is no chance of air entering the latter. The only remaining vessel of importance is the posterior scapular, which is not cut till the end of the operation.

Third Stage. Cutting the Flaps and Removing the Limb.—Two flaps are to be made.

1. An antero-inferior flap.—From the middle of the first or clavicu-

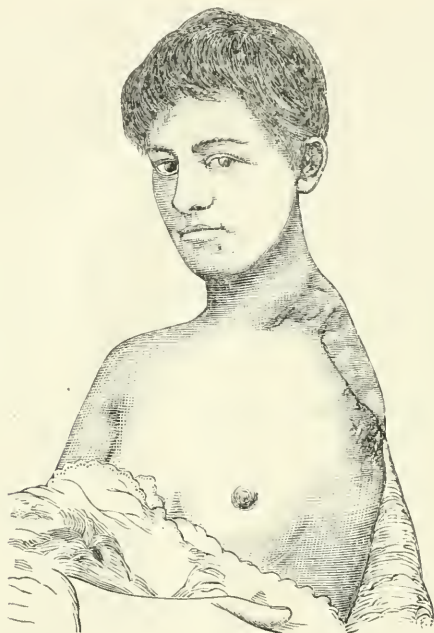


FIG. I.—RESULT AFTER AMPUTATION OF ENTIRE UPPER EXTREMITY.

lar incision another was carried down the front of the shoulder, and across the inner side of the arm in a backward direction to the tip of the angle of the scapula where it terminated.

The integuments were lifted up for a little way and the pectoralis major and minor cut across,

The large cords of the brachial plexus were next severed, and the arm with the axillary tumor was drawn away from the side as in the dissecting room. The latissimus and teres major forming the posterior fold of the axilla were also divided.

2. A postero-superior flap.—The patient being rolled on to the sound side and the limb drawn across the chest, an incision was carried from the outer end of the first or clavicular. one straight down the back of the shoulder to the angle of the scapula where it joined the preceding.

The integuments were dissected up as far as the vertebral border of the scapula and the limb severed from the body by sweeping the knife along its upper and posterior borders close to the bone so as to divide successively all the muscles there attached.

Before closing the wound I had next to give my attention to the removal of the supraclavicular glands, a proceeding which I found rather tedious and difficult.

The immediate result of the operation was most satisfactory, the flaps fitted admirably, without tension or redundancy, and the total wound surface was of very moderate dimensions. The wound was quite healed and the patient up in three weeks. Very little blood was lost from the circulation, and scarcely any depression of vital power followed the operation. (See Fig. 1.)

Tumor.—This was an ossifying periosteal sarcoma (mixed celled). The secondary gland tumors were also in process of ossification.

Subsequent history—Symptoms of recurrence of the disease in the cervical glands appeared at an early date, and a tumor, which ultimately attained enormous dimensions, formed there, of which she died within the year.

No post-mortem could be made.

CASE II.—G. D., 17, a male, was brought to me in March, 1888, by Mr. West, of Coventry, for a large sarcomatous tumor of the upper end of the right humerus. He had noticed it six months before, but the rate of growth had recently become very rapid. The shoulder was obscured and the axilla filled by an ovoid swelling of firm consistence. The scapula was overlapped, but not implicated, and the movements of the joint were fairly free. The skin was tight but not implicated, and no enlarged glands were to be felt in the neck or axilla.

While it was obvious that no form of shoulder-joint amputation could suffice, the case appeared admirably suited for the operation just described. I proposed it, but the patient declined, and returned home for five weeks. When at last he consented, the tumor was much

larger, but I was able by shortening and modifying the outline of the flaps to give a wide margin of healthy tissue.

The operation was so identical with the preceding that I need not describe it in detail. I may note, however, that the method permits of very considerable modification of the outlines of the flaps to meet the requirements of individual cases. The hæmorrhage, too, was more free than in the other case, but apparently from the tumor rather than the general circulation.

The lad suffered wonderfully little shock, and the wound rapidly healed, so that he returned home with it sound in a month.

Up to the present time he has remained free from any sign of recurrence. The tumor was found to be a soft (round celled) periosteal sarcoma, showing small patches of caseation.

From my experience of these cases I believe the method offers a very sure and efficacious means of performing the operation. At the same time I think it will be found to suit cases of disease better than those of injury. In the latter we have so commonly to cut the coat to the cloth, and the condition of the patient frequently renders any elaboration of our proceedings undesirable.

From all sources Berger has collected together 50 cases of the operation done by all methods, which may be grouped into three orders:

1. Traumatic cases—13, with 8 recoveries and 5 deaths; a mortality of 1 in $2\frac{1}{2}$.

2. Total pathological—21; 17 recoveries, 4 deaths; mortality 1 in 5.

3. Consecutive or secondary pathological, *i. e.*, of the shoulder bones, for recurrence of disease after previous amputation at or below the shoulder joint—16; 13 recoveries, 3 deaths; mortality, 1 in $4\frac{1}{2}$.

This shows, as we should expect, a considerably higher mortality for traumatic than pathological cases, due to the initial shock and loss of blood, but somewhat contrary to what we might expect (as in the hip) gives no advantage to the secondary over the total amputations.

CAUSES OF DEATH.

These range as under :

Hæmorrhage, entrance of air into veins.

Shock of operation, of injury.

Purulent infection, secondary hæmorrhage, exhaustion and sloughing.

Undoubtedly, hæmorrhage is the most formidable of the difficulties, occurring not only from the main trunks, but from the numerous large anastomosing branches round the shoulder; also the large veins over the tumor may be a source of embarrassment and danger.

Three of the deaths are due to uncontrollable hæmorrhage, but it doubtless contributed in some of the other cases.

Entrance of air into veins is to be feared as we approach the confines of the dangerous region. It occurred in 4 of the cases, and is credited with 2 deaths.

Shock has been most fatal in the cases of injury. In the production of this, the primary shock has largely contributed, the patients being in a state of great vital depression at the time of operation. Pure operative shock, as in the pathological cases, is not a marked feature. In my own cases it hardly existed. The operation is in this respect much more favorable than that at the hip.

Of the consecutive complications—wound diseases—we shall hear less under present conditions of wound treatment, though sloughing of flaps may always occur where the tissues have been devitalized by injury.

Indications for operation. These have been as follows :

I. Tumors of scapula necessitating removal of the greater portion of that bone.

II. Tumors of upper end of humerus :

1. Benign, if of such excessive size as to render amputation at the shoulder impracticable.

2. Malignant; developed so far as to englobe the articulation : to invade the scapula or the muscles passing from it, the skin over the deltoid, and above all the lymphatic glands in the axilla.

III. Traumatic cases. These are commonly operations of

necessity, including such injuries as gun and cannon shot wounds with extensive shredding and laceration of integuments round the shoulder; machinery accidents, causing extensive lacerations and comminution of bones and tearing away of the entire limb.

PRINCIPAL FEATURES OF VARIOUS OPERATIVE METHODS.

First for control of hemorrhage:

1. Compression, digital or instrumental, above the clavicle, the vessels being tied on the face of the flaps in the ordinary way.
2. Direct compression after excising the middle third of the clavicle.
3. Ligature of the subclavian artery by separate (supra-clavicular) incision.
4. Ligature of ditto after resection of middle third of clavicle.
5. Ligature of both artery and vein by separate (supra-clavicular) incision.

It will be seen that none of these methods fulfil all possible and requisite conditions of safety so thoroughly as Berger's.

Second, as to the order of division of parts.

In a considerable number of the cases the surgeon has first removed the arm at the shoulder, and then having secured the large vessels, proceeded to the removal of the other bones by separate incisions along the clavicle and spine of scapula. Generally, however, they have all been removed together, and when this is the case there is no doubt the scapula should come last in the order of procedure.

“PLASTIC” AMPUTATIONS OF THE FOOT.

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OF all the typical amputations of the lower extremity, those of Syme and Pirogoff give the best results, especially as regards the ultimate usefulness of the limb. In the latter respect, amputations through the middle and lower thirds of the leg have no advantage over amputations just below the knee-joint, and are indeed at a comparative disadvantage, for when the patient wears a “kneeling-leg,” the long stump sticks out behind and in the way.

I have already shown how a kind of Syme may be performed for the cure of ulcer of the leg, the skin and other soft tissues of the sole and sides of the foot being preserved and utilized to cover the site of the ulcer. (See ANNALS OF SURGERY, vol. vi. p. 100).

The following case demonstrates *the practicability of doing an amputation through the ankle-joint as good as a Syme even when the heel is destroyed.*

Edward O’Neil, æt. 11, schoolboy, admitted in the West London Hospital, Feb. 28, 1888, his foot having been lacerated and crushed by the wheel of a wagon passing over it. The skin and subjacent soft tissues of the heel and great part of the sole and sides of the foot were torn away from the ankle downward, and hung down. A narrow anterior bridge of skin united the skin of the leg with the skin on the dorsum of the foot. The skin, fat and other superficial tissues were detached from the muscles, etc., of the sole as far forward as even beyond the bases of the metatarsal bones. The posterior tibial artery could be felt beating, but not the anterior. Indeed the tendons and deep structures appeared to be more injured on the dorsal aspect of

the ankle than in the sole of the foot. Some of the extensor tendons were lacerated, and the joint between the astragalus and scaphoid opened on the dorsal aspect. Hæmorrhage was considerable. A consultation having been held, it was decided to give the skin of the heel a chance to live.

The foot having been cleansed, a small drainage tube was passed beneath the bridge of skin left intact so that it rested on the open Chopart's joint. Another was passed from just internal to the Achilles' tendon downward through an incision in the heel, and then the flap torn forward was pulled back over the heel into its proper place, all tension being carefully avoided.

No vessels required tying. Oozing was arrested by hot weak carbolic lotion poured gently over the surfaces.

Large antiseptic dressings, iodoform gauze next the wound, then sublimate packing, and, over all, a great deal of salicylic wool. The foot was swung high with an anterior splint on the leg, ankle and foot.

Partly owing to a tendency to bleed and partly on account of pain and discharge, the dressings had to be changed daily. On the third day it was evident that the heel skin would not live.

The gangrene spread till March 4 (sixth day), when the slough separated, the entire heel and a great part of the sole formed a wound covered with exuberant granulations, very hæmorrhagic and discharging freely. The evening temperature from the 10th to the 21st of March varied between 99° and 100°, once reaching 101°; but the boy's general condition was not good or improving. The epiphysis of the os calcis had necrosed. Sleeplessness and constant pain.

The nature and extent of the injuries, and especially *the destruction of the anterior tibial artery made an osteoplastic resection of the Miculicz-Wladimiroff variety impossible.*

The following resection was performed: Esmarch's bandage having been applied, a longitudinal incision was made from above the upper border of the os calcis down to the base of the fifth metatarsal bone, curving down over the heel and sole of the foot, *i. e.*, not running along its outer side. The Achilles tendon being divided, the os calcis was seized with lion forceps and rotated in different directions as its attachments were cut until it came away. The astragalus was similarly dealt with. The cuboid, scaphoid and external and middle cuneiform bones were removed in a mass through the same incision. The internal cuneiform was extracted conveniently through an old wound lying immediately over it.

The malleoli and articular surfaces of the leg bones were sawn off, as were also the articular surfaces of the metatarsal bones.

All the granulations. (which formed a jelly like mass), were scraped away.

The metatarsal bones were wired with two lateral sutures to the tibia and fibula.

The deep structures of the sole and inner side of the foot formed a large bulging mass, of course uncovered. None were cut away except two or three tendons, including the tibialis posticus and peroneus longus. No drainage tubes were needed. When the Esmarch was removed, no bleeding followed, although the circulation was rapidly restored.

During the next few days the discharge was very profuse, there was a great tendency to hæmorrhage, not from any particular vessel, but rather from the granulations which were rapidly reforming. On one occasion the bleeding was very profuse. The temperature generally rose in the evening to 100°, and sometimes to 101°. And the pain complained of was very great.

The frequent dressings necessary were interfering seriously with the fixation of the part, and signs appeared that the wire sutures were cutting through the soft structures of the boy's metatarsal bones. It was obviously desirable to obtain a wound calculated to make less demands on the patient's powers of repair and endurance.

Accordingly, April 2, 34 days after the accident, and 12 days after the resection the following amputation was performed. (Considerable hæmorrhage had occurred early in the morning so that I found a tourniquet applied on arriving at the hospital at 10 A. M.).

Amputation.—The sole of the foot still remained sound for two or three inches posterior to the balls of the toes. This was cut away from the subjacent metatarsal bones and then remained connected to the limb only by the mass of soft tissues containing the internal and external plantar vessels and nerves. All this mass was cut away, except a bridge of flesh (uncovered it will be remembered by skin) narrow at the base behind the site of the inner malleolus and growing wider toward the piece of skin at its extremity. The fleshy bridge contained the plantar vessels and nerves.

The surface of the tibia and fibula was now refreshed, and *the skin, etc., which had been reflected from the anterior part of the sole of the foot behind the balls of the toes, placed upon the ends of these bones* so refreshed. Sutures fixed the margins of this skin flap to the skin of the ankle on three sides. On the fourth (or postero-internal) side its

"peduncle," so to call the bridge of tissues containing the plantar vessels and nerves, formed a rounded fleshy projection, of course not covered by skin. The end of the stump was, however, completely skin-covered, and the amputation was mistaken for an ordinary Syme by all to whom it was shown without explanation.

A small drainage tube was used. Esmarch's elastic tourniquet used. Operation practically bloodless.

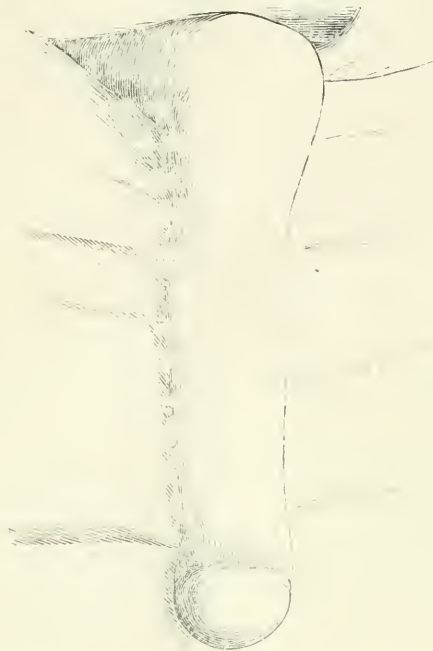


FIG. 1. RESULT AFTER PLASTIC AMPUTATION OF THE FOOT.

April 3. (Day after operation). Much better, passed a good night, slept after 10 minims of laudanum. Has had scarcely any pain since the operation. Dressings not soiled. T. 98.8° in morning, 101.6° in evening.

April 4. Dressed. Little discharge, drainage tube removed. The temperature fluctuated slightly, though with a gradual tendency downward, and did not remain steadily normal till nearly five weeks after the amputation.

The principal notes for the next three weeks refer to a rather large

lacerated wound which the patient had received at the time of the accident, toward the back and one side of the leg just below the knee and also to a small superficial abscess which formed in the right sacro-gluteal region," but was speedily cured. The amputation stump was dressed on the 3rd, 11th, 17th, 22nd, and 24th day of the operation. Boracic lint soaked in red lotion was used at the third dressing. Grafts were afterward implanted occasionally, and the lump of uncovered flesh formed by the peduncle of the flap was cicatrized over at the beginning of August. This was four months after the amputation, but need not have been so long had skin grafting been resorted to earlier than it was. The "peduncular prominence" had shrunk in size very remarkably. The stump is quite shapely, and firm pressure can be borne on the end of it. The patient's general condition is admirable. The wound behind the knee is not quite healed, and shows a tendency to cause some contraction at that joint.

I do not advocate this amputation as a universal substitute for osteoplastic resection. I rather bring it forward as *a type of a mode of combining a plastic operation with amputation* in such a manner as to enable amputation to be performed at a much lower level in a given case, and at the same time to produce a superior stump.

The annexed illustration from a photograph by Mr. Sidney Bontor, displays the stump to the best advantage, but conceals the lump which, on the inner and posterior aspect, constitutes the remains of the bridge of tissue containing the plantar arteries and nerves. Dr. Percy Lush recorded the notes of the case.

A CASE OF REMOVAL OF BOTH TESTICLES FOR RECURRENT CARCINOMA OF THE EPIDIDYMIS.¹

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Early in January, 1887, John S——, a powerfully built, Irish laborer, thirty-five years of age, applied for admission to my service in St. Mary's Hospital with the following history.

Two months previously he had first noticed a hard nodule in the epididymis of the right testicle,^o his attention having been called to the part by lancinating or burning pains which gradually became almost continuous as the tumor increased in size, which it rapidly did, so that in the time mentioned it had attained to about six times its original dimensions. On examination a tumor involving the head of the epididymis was easily located, the skin of the scrotum being firmly adherent to it.

The mass had the stony hardness of a schirrous growth, was very sensitive to pressure, and was about the size of a large grape. A small nodule possessing similar characteristics occupied the tail of the epididymis, but the testicle itself seemed free from disease. No induration of any of the lymphatics in the neighborhood was discovered, and the left testicle seemed perfectly healthy. The patient denied having ever had any venereal disease, in fact that he had ever been exposed, and knew of nothing in his family history which would clear up the diagnosis.

I explained to him my suspicions as to the nature of the

¹Read before the American Association of Genito-Urinary Surgeons, at Washington, D. C., Sept. 19, 1888.

growth, and that any deception on his part would lead to a grave error in treatment, but he only reiterated his statements and told me to do what I thought best for him.

I accordingly proposed an immediate extirpation of the testicle, and on Jan. 28th removed it, with all adherent skin and a high section of the spermatic cord.

The cavity remaining was carefully irrigated with a 1-6000 mercuric bin-iodide solution, a bone drain introduced and the cutaneous flaps approximated by a continuous catgut suture. Iodoform dusted over the skin and a massive paper-wool compress completed the dressing, which was left undisturbed for twelve days.

Feb. 9th. The wound was exposed for the first time and found completely healed except at one place where a ligature from the cord still remained attached. This came away at the next dressing, Feb. 14th, and the patient left the hospital. Feb. 22d, perfectly well, and with no sign of trouble with the remaining testicle.

On referring the tumor to Dr. L. E. Tieste, the Pathologist of the Hospital, for examination, I obtained a report from which I quote: "The tumor was an irregularly shaped mass, and there was no definite line of demarcation between the normal and diseased tissues.

Superiorly where the hardness was most marked, it was gritty on section by the knife, and presented the glistening white color with small yellowish spots, characteristic of schirrus. On microscopic examination well formed connective tissue was found containing numerous blood vessels. It was interesting to note the large number of cells and "cell nests" which were much more numerous than is usual in cases of schirrus. These may be accounted for by a rapid development."

The diagnosis of schirrus made by Dr. Tieste was confirmed by Dr. J. H. Hunt, the Hospital Curator, who examined sections from different portions of the tumor. I saw the patient occasionally until April, when I lost sight of him, but on May 1st he again presented himself at the Hospital, declaring that since our last interview the characteristic pains had returned in the left testicle and that a tumor had rapidly developed

during the last month. On examination I found a mass about half the size of the first tumor occupying the left epididymis and having the same physical peculiarities. No sensitiveness or induration existed in the stump of the right cord, nor was there any enlargement of the iliac, lumbar or inguinal glands on either side.

An immediate operation was proposed and assented to, and on the following day I removed the left testicle with the same precautions which I had adopted on the right, except that cat-gut was used in the place of silk for the ligating of the vessels of the cord.

On the following day and for several following the patient's temperature never exceeded $98\frac{1}{2}^{\circ}$, but on the morning of the sixth day, it suddenly rose, and on removal of the dressings the wound was found nearly healed, but with a swollen and suppurating area about its upper angle. This accident which was due to an orderly's carelessness in disturbing the dressings, delayed the progress of the case slightly, but the patient was well enough to leave the Hospital on May 17th with a small fistulous opening in the scrotum which healed in a few weeks, when he again returned to his work as a porter in a large manufactory. At an interview on July 8th, '88 he told me that he had been steadily at work ever since, and the most careful inspection failed to discover any signs of the return of his disease.

A microscopic examination of the specimen removed, resulted in a similar opinion as to the nature of the disease, and as in the first instance the testicle was not involved in the diseased process. The microscopic appearances of the sections examined, seem identical with those reported by Hulke and Curling as seen in a case of schirrus of the testicle presented to the London Pathological Society by Bryant.

I have deemed the case worthy a full report not only on account of the extreme rarity of the disease which it illustrates,—I have been able to find only twenty seven cases of carcinoma testis recorded during the last twenty years¹—but because of special features of its own.

¹The Operative Surgery of Malignant Disease. Butlin, p. 289; and current medical literature since publication of above.

So far as I know it is the only case yet recorded, in which the schirrous form of carcinoma has manifested itself as a primary affection of the epididymis, and recurred after a short interval in the same organ on the opposite side without any reappearance at the site of the first operation, or extension by glandular or cutaneous infiltration. It is also a very rare exception to the rule that where the scrotum is involved at the time of the operation, speedy recurrence in the glands of the affected side occurs. The acuteness of the attack and rapid recurrence are rare too, as considered in relation to true schirrus, which usually pursues an essentially chronic course. Cooper and Curling both narrate cases of schirrus of the testis as occurring in men previously healthy, but in the former's patient the disease had been in progress a year when submitted to operation, death resulting a month after, while in the latter's case the man had suffered for five years, abscess having formed, and the scrotum being involved, yet—the case being considered unfit for operation,—lingered for another year before terminating fatally. Whether the ultimate result in my own case will be favorable or not is of course still doubtful, as the "three years limit" deemed essential by Butlin and other writers has not been reached, but as in almost all fatal cases the recurrence of schirrus after operation has been very rapid, I am strongly hopeful that as in other respects my patient may prove an exception to the rule.

EDITORIAL ARTICLES.

THE ARRAIGNMENT OF CATGUT.—THE DESIRABILITY OF SIMPLICITY OF METHODS IN OBTAINING CERTAIN ASEPSIS IN SURGICAL WORK.

In the surgical clinic at Berne,¹ a series of cases of interrupted healing of wounds occurred, which pursued so typical a course as to suggest to Kocher the existence of a common origin of infection. A total and thorough revision of all antiseptic apparatus and dressings failed to correct the trouble, and thus the question was narrowed down to the catgut used in the clinic. Acting upon this, the catgut was finally excluded from consideration by its complete abandonment when the usual aseptic course of cases operated upon at the clinic was at once restored. At first, a comparison of cases treated by silk for purposes of both ligature and suture, with those in which catgut was used, demonstrated, in a most convincing manner the greater safety of the former, as compared with the latter in furnishing immunity from wound infection, other conditions remaining precisely the same.

There can be no question but that in the catgut of commerce, produced as it is in large quantities, and prepared by those who possess in but a slight degree a knowledge of the absolute and rigid precautions needful in order to obtain typical aseptic wound-healing, and in whom there is but little reason to expect the exercise of that care so essential in the preparation of this exceedingly important part of the *armamentarium chirurgicum*, hidden sources of infection, and dangers threatening at once to the life and limb of the patient, as well as to the reputation of the surgeon exist. And without doubt this is likewise true of the surgical silk, gauze and other antiseptic appliances furnished by the manufacturers in large quantities, and which must be

¹Korrespondenzblatt für Schweizer Ätze, 1888.

handled more or less by persons whose main object must necessarily be from the very nature of things, to do a day's work and get a day's pay.

Not long since the attention of the writer was called to a can of iodoform gauze which bore the label of one of the most prominent manufacturers of so-called surgical antiseptic appliances, and upon which it was stated that the contained gauze was treated with 33% of iodoform. He was informed that a careful analysis of the gauze had revealed the fact that it contained but just sufficient of the drug to impart its characteristic odor, and that its beautiful rich iodoform color was due to the fact that it had been treated with a yellow aniline dye. Here was an instance of the grossest mendacity, the risks of which are to be added to the ordinary chances of inefficiency and carelessness in the hands of those to whom are entrusted the preparation of antiseptic materials.

To return to the question of infection by means of imperfectly disinfected catgut, one is reminded of the notable instance reported by Volkmann, in which true anthrax was produced by direct infection from the use of that material. Kocher was early impressed with the difficulties in the way of a thorough sterilization of an animal product in the meshes of which are to be found an almost constant proportion of fatty matter, whose presence will successfully resist our very best efforts to bring the most potent germicides in contact with the minute interstices of its structure. For the purpose of removing this fat, he proposed to treat the gut with juniper oil, but even this has sometimes failed of its object, and, realizing the fact that heat and heat alone, is the only really efficient means of sterilization, and that catgut cannot be thus sterilized without destruction of its texture, he strongly urges that such a material, so easy of infection, and so difficult of disinfection, be permanently banished from surgical practice.

These unfavorable experiences on the part of Volkmann and Kocher will make a deep impression upon the surgical world, and well they may; for no one can possess a feeling of implicit confidence in the precautionary measures grouped under the general head of antiseptis, so long as such grave charges can be brought against a material here-

tofore considered so essential to what is now looked upon as a perfect result, *i. e.*, union of divided structures without inflammation or supuration.

In order to do away with the necessity of buried ligatures to a great extent, it is considered advisable to perform torsion upon all vessels, and if, upon removing the clamp forceps after the operation, any vessels continue to bleed to ligate these with silk. Deep silk sutures, with or without button attachments, carefully placed so as to obliterate pockets or dead spaces, will frequently do away, according to Kocher, with the necessity for drains of any kind. Where these are needed, he insists, in accordance with his views upon the use of those materials only which can be sterilized by heat, that glass drains alone are applicable or safe. In so far as the operation itself, from the length of time occupied in its performance and the consequent exposure to noxious influences of the wound surfaces for a length of time, or from invasion of parts which render it impracticable to close pockets or dead spaces, demands the use of drains, their advantages are conceded. But in clean cut and straight walled incisions, made during an operation executed with celerity and under antiseptic precautions and surroundings worthy the name, there can be no question concerning the not unmixed good arising from their use. In aseptic cases their use can be indicated, but for a day or two, at the utmost, and they should be withdrawn as soon thereafter as possible.

The use of water-proof coverings to absorbent wound dressings is now practically abandoned. No better bar to the entrance of pathogenic germs has been discovered than the dried germless secretions of the wound itself. The necessity for any permanent antiseptic in the dressings themselves is questioned except in the case of suppurating wounds, and for these, extemporized dressings with iodoform, etc, are far preferable. But in wounds of an aseptic character, gauze, previously sterilized by means of heat, and just prior to application wrung out of a 1-1000 sublimate solution, and crumpled so as to favor permeation of the same by the wound secretions, is advised. Wood wool, sawdust, or paper wool cushions may be added if deemed necessary.

Strangely inconsistent with our present views upon asepsis and the necessity for simple and efficient means for securing the same, is the recommendation of the use of sponges during the operation; yet, Kocher, as well as some other recent writers upon asepsis, mentions cleansing of the sponges, and measures for the resterilization of the same after use. The artificial sponges or "tupfer" of the Germans, made from waste pieces of gauze and tied in a square of the same material so as to form a convenient sized bunch for drying the wound surfaces, possess the double advantage of cheapness which enables one to throw them away after once using, and ease of sterilization by means of prolonged boiling in a covered vessel.

Important as is the matter of the disinfection of the surgeon's hands, it is simply recommended that they be brushed with soap and water, dipped in a 1-1000 sublimate solution, and allowed to remain without being dried upon a towel. The researches of Kümmel, of Hamburg, Forster and Wassing, of Amsterdam, and Furbringer, of Berlin (*ANNALS OF SURGERY*, vol. vii, no. 2 p. 153) demonstrate fully the importance of a careful disinfection of the hands, and particularly of the collections in the subungual spaces. So far as the latter is concerned it has always seemed to the writer that the best way to avoid the accumulation in the subungual spaces is to obliterate the spaces themselves by trimming the finger nails so closely as to render it impracticable for any collection to take place. It seems to be pretty definitely settled that the most vigorous measures compatible with the integrity of the skin itself are needful in order to prevent infection through the surgeon's hands, particularly if he deal with septic and aseptic cases indifferently. Laving the hands in alcohol for a minute or two after scrubbing and rinsing them in running water, and then dipping occasionally during the course of the operation in 1-1000 sublimate solution, seems to have been settled upon by surgeons as offering the best means of protecting wounds from infection through this medium.

GEORGE R. FOWLER.

THE TREATMENT OF SIMPLE FRACTURES AROUND AND PENETRATING INTO THE JOINTS.

After speaking of the unfavorable prognosis of simple fractures penetrating joints, Professor Max Oberst, of Halle, gives¹ as the chief causes of the frequent ankylosis the following:

1. The prolonged rest of joint used in the treatment of the fracture.
2. The inflammation following the traumatism.
3. The over-production of callus.
4. The ordinary intra- and extra-capsular blood extravasation associated with the fracture.

As a result of prolonged immobility of a joint, from whatever cause, there often result serious disturbances in which the neighboring soft parts, as well as the joint itself, are associated. The muscles become contractured, and as a result, permanent and often pronounced tissue changes follow. Fasciæ, ligaments and capsule become shortened, while the cartilage where it comes in contact with its neighbor remains sound, the part out of contact becomes fibrous or stringy, and at the border of the synovial membrane begins a connective tissue proliferation which often interferes with the cartilage, and in the worst cases causes obliteration of the joint cavity.

Another cause of stiffness and ankylosis of a joint is the inflammatory processes following the injury.

There is often an accompanying hæmarthrosis due either to the contusion, to rupture of the ligaments, dislocation of the joint, or to the fracture entering the articulation, and especially are inflammatory conditions caused by a more or less marked dislocation of the fragments.

Over-production of callus has often been ascribed as a cause of

¹Volkmann's Sammlung klinischer Vorträge, No. 311.

stiffness of joint, and in fractures within the joint this is without doubt over-estimated, for, according to Bruns, in these cases the callus only fills up the fissure in the bone, and in only extremely rare cases does it assume the form of an exostosis.

In cases where the fracture is situated entirely or for the most part outside of the joint over-production of callus is almost a rule, and is especially seen where there is much displacement of fragments.

Hæmarthrosis is always present in fractures penetrating the articulation, as in most, if not nearly all fractures around a joint.

Volkman has often called attention to the disastrous consequences of blood within the articular cavity, and has proven that complete ankylosis, with total obliteration of joint, can result, even when the blood has become coagulated and organized.

Blood exudations outside of the capsule, may also be a source of danger to the future function of the limb, for when extravasated within the sheaths of tendons it may become organized and cause adhesions between the tendon and its envelope.

For the prevention of ankylosis or stiffness of the articulation after a fracture, Professor Oberst insists on the following points :

1. The extravasation of blood must be done away with as rapidly and as completely as possible.
2. The deformity reduced and the fragments held in place by proper dressings.
3. The joint must not be immobilized for too long a time.

When prolonged immobility is deemed necessary, carefully performed passive motion ought to be made at least once a week.

Where there is much blood extravasated it is to be removed either by aspiration or, if this is out of question, methodical compression and massage are to be used. Methodical compression is applied by means of Martin's rubber bandage, care being taken that the fragments are in proper position, and that the important vessels are protected from pressure.

The good effects of methodical compression are greatly enhanced by massage.

In treatment of Colles' fracture, Prof. Oberst proceeds as follows ;

The displacement having been entirely reduced, the hand and forearm are fastened on a splint which is so constructed as not to interfere with the movements of the fingers, and the further treatment depends on the amount of extravasated blood.

If no marked extravasation exists on the third or fourth day the splint is removed, wrist joint and fingers are actively and passively exercised, then massage used to hand and forearm. Plaster of Paris bandage applied which is removed in a week when further massage is used and splint reapplied. On the fifteenth or eighteenth day the fracture is sufficiently consolidated to permit permanent removal of the splint and patient is allowed to gently use his hand.

Should there be much extravasation the limb is fixed on a Schede's splint and over this a Martin's bandage is carefully and lightly applied. The bandage is to extend from middle of metacarpus to middle of forearm, and is to be readjusted every day.

Compression is to be kept up as long as marked swellings exist.

On the fourth day splint taken off, active and passive motion of hand and fingers and massage, dressing reapplied. Passive motion and massage to be used daily till the extravasated blood is absorbed, this usually occurs about the seventh or ninth day after injury. Further treatment is the same as mentioned above.

Massage is not to be used before the fourth day, as manipulations may give rise to fresh extravasations of blood. During massage hand and forearm are to be held by an assistant so as to prevent motion taking place at the point of fracture.

Forty-one (41) cases thus treated have given most satisfactory results. In the majority of cases the patients were able to use their hand on the fifteenth or eighteenth day after injury. In the worst cases the treatment was extended over a period of four (4) weeks.

Much the same plan of treatment is used in fractures of the lower articular end of humerus.

The limb is enveloped in a thin layer of cotton extending from wrist joint to middle of arm, and light compression is made by means of a flannel bandage, and limb placed on a splint. The splint used by the author is a modified Levis, which can be fixed at any angle,

and is applied to flexor surface of limb, the forearm being in full supination. In most cases this splint can be used throughout the whole course of treatment, Plaster of Paris only used in cases where it is difficult to maintain the fragments in their proper place.

When there is not much extravasation the splint may be taken off every four or five days and gentle passive motion made and massage of arm and forearm. In most cases about the fifteenth or seventeenth day consolidation has sufficiently taken place to allow permanent removal of dressings.

In severe cases and where much blood has been extravasated, the treatment is slightly modified. Martin's bandage applied over splint, and readjusted every day. On fifth or sixth day passive motion begun. Absorption of effused blood takes place about ten or twelve days after injury. Plaster of Paris bandage then used, and is removed and reapplied every five or six days, massage and passive motion being used. The position of elbow is changed at each dressing. The result in ten cases thus treated left nothing to be wished for.

The treatment by immovable dressings is never to extend beyond a period of three weeks, even in the worst cases.

F. C. HUSSON.

INDEX OF SURGICAL PROGRESS.

BONES, JOINTS, ORTHOPÆDIC.

I. Intra-articular Exostosis of the Knee-joint. By DR. THILO, EHRHARDT (Halle). The author records a case of intra-articular exostosis cartilaginea, a very rare variety of exostosis which was operated on with complete success in Volkmann's clinic. The patient, æt. 24, male. The growth was situated on the internal condyle of the left femur. The case before operation was diagnosed as arthritis deformans with free bodies in the joint cavity. After unavailing treatment with bandages, the knee was incised longitudinally on the inner side of the joint, the synovial fluid was allowed to flow out, and 3 free bodies each the size of a small walnut were obtained from the joint. On examination, however, the disease proved an exostosis on the inner condyle entirely within the joint capsule, of an irregular nodular character, the external surface covered with cartilage similar to that of the articular end of the femur. It protruded beyond the inferior and inner borders of the condyle, and on the whole appeared of larger size than the articular end of the femur. Volkmann then chiseled off the growth until the condyle assumed its normal shape. This operation left a sort of triangular field, exposing the spongiosa of the condyle. A counter incision was made on the right side of the joint, the joint cavity well cleansed and three drains inserted. The joint was powdered with iodoform and the whole put up in a typical dressing of carbolyzed gauze and moss cushion. Six days subsequently dressing removed; no suppuration; drains removed. The second bandage renewed after sixteen days. A water glass bandage was then put on, and after six weeks the patient was discharged able to walk. Fehleisen, Billroth and Rindfleisch have recorded cases of similar exostosis but, although the growths seemed surrounded by a bursa after the man-

ner of an articular extremity, the exostoses were not situated *within* the joints as in the case of Volkman, Virchow first described these exostoses, and ranked them among the rarer variety. The large operative material of Volkmann, however, would tend to prove that the "exostosis cartilaginea" is the most common variety of *exostoses*. Volkmann has suggested to rank only those exostoses covered with cartilage among the tumors in the stricter sense of the definition. For bony outgrowths not covered by cartilage seem to the clinician at least rather a result of inflammatory processes, rather osteophytes in their nature, a typical, well defined, new bony growth of periosteal development. According to the theories of the author the exostosis has its origin in a trauma inflicted on the epiphysis of the growing bone. No inflammation results, but a simple dislocation of cartilage cells out of their normal longitudinal arrangement as seen in the epiphysis of a developing bone. These cells simply turned from the longitudinal to the transverse diameter of the bone continue to grow, but in an abnormal manner (outwards from the epiphysis). We have thus resulting a cartilaginous outgrowth later ossifying into an exostosis covered with cartilage, contemporary with the growing bone. In Volkmann's intra-articular growth this mode of origin from the articular end of the bone seems simplest to the author. *Zeitsch. f. chir.*, Bd xxvi, heft 1 and 2.

II. The Phelps' Method of Treating Club-Foot. By A. PHILLIPSON, M. D. (Hamburg). The author gives a concise description of the Phelps method of operation for club-foot deformities. The division of cases by Phelps is closely adhered to—(a) those cases which are easily corrected, (b) where tendon and fasciæ are contracted, (c) where all the tissues are contracted, tendons, fasciæ, muscles. In the first set of cases simple means by which the foot is placed in normal position, splint, massage, electricity, suffice. In the second class the tendo Achillis and plantar fascia are divided, and where necessary the tendon of the tibialis posticus is divided from the internal malleolus: at the same time the deltoid ligament is divided completely by a circular incision passing close to the border of the internal malleolus. The

scaphoid is thus brought to a normal position with the astragalus and the calcaneus can be replaced also. The foot is then fixed with splint in normal position. In the third class the Achilles tendon is divided subcutaneously, but to this is added an open incision, extending from a line joining the inferior border of the int. malleolus to Chopart's articulation, perpendicularly 3 or 4 cm. toward the plantar surface of the foot. The tibialis posticus, the lateral ligament, flexor longus digitorum, the abductor hallucis, flexor hall. long. are according to necessity divided. Plantar fascia and flex. brev. are divided if offering any resistance, the foot being strongly redressed at intervals during the operation. After operation plaster bandage is applied until the wounds have healed. Then the elastic apparatus of Phelps can be used to keep the foot in good position. In paralytic club-foot belonging to the third class, carry the above elastic apparatus permanently. In the Hamburg general hospital the wound after the operation is covered lightly with protective, then sublimate gauze dressing, and this is covered with turf moss cushion, and finally plaster bandage. After four weeks this is removed, and a removable plaster and water-glass bandage put on for six to twelve weeks. This last splint reaches to the knee, and the patient is able to walk in it. The patient is then fitted with the removable plaster boot of Dr. Hausmann. (*Archiv. f. klin. Chir.*, Bd. 32, s. 989.) *Deutsche Zeitsch. f. Chir.* Bd. xxv. heft. 3.

HENRY KOPLIK (New York)

III. Osteotomy, a Radical Cure for Hammer-Toe. Dr. EUGÈNE COHEN (Paris).—In this affection the toe is continually in a state of extension on the metacarpal bone, the interphalangeal joint is extremely flexed, and the last or small phalanx is either bent under the toe or points forwards. The skin becomes so irritated that a bunion is soon developed, and inflammation is often so bad that the toe has to be amputated. M. Terrier was the first to practice excision of the joint. A large circular flap, including the bursa, is cut over the joint which is then opened. The extensor tendon with its sheath is cut through, as are also the two lateral ligaments. The two articular sur-

faces are then cut away with the bone nippers. Horse hair sutures have to be put into the skin only, and a small drainage-tube is left in the wound. A small splint is bandaged on, and all due antiseptic precautions having been taken, cure is completed in a fortnight, and the patient able to walk about.—*Le Progrès Medical*, Aug. 20, 1887.

LEONARD MARK (London.)

IV. On Arthrectomy of the Knee-Joint in Children. By DR. MANDRY (Tuebingen). The author calls attention to the various phases in the history of resection of the joints, their enthusiastic reception at the commencement of the antiseptic era in surgery, and their restriction in the tuberculous disease of joints, where it became apparent that complete eradication of the tissue was not always affected by these means. Moreover, in the knee joint in children, typical resections were followed by serious defects in the growth and position of the joint, so that with this joint a typical resection is now almost universally acknowledged an unjustifiable operation. He advocates extirpation of the capsule and scraping out of any tuberculous foci, a practice which in seven cases at Tuebingen led to excellent results; in four of these cases healing per primam resulted; in two others with circumscribed suppuration, and in one case incision and scraping of the fistulous ducts had to be repeatedly resorted to. In one of the cases that had apparently healed per primam a tuberculous focus had unfortunately been overlooked, and resection became necessary later on. The operation is performed in the following way: Incision over and through the patella or the tendon of the quadriceps; extirpation of the entire capsule with forceps and scissors; thorough scraping in bone and soft parts of any tuberculous matter; no healthy cartilage or bone substance is removed; irrigation with sublimate-solution; suture of the quadriceps or patella with dropped catgut or sea-grass-stitches; suture of the skin; Watson's splint; and finally Plaster-of-Paris bandage to counteract the tendency to flexion. If the latter should develop, forcible extension is practised, and a new Plaster-of-Paris dressing applied. The final results after $2\frac{1}{2}$ — $3\frac{1}{2}$ years showed in one case almost normal mobility of the joint. Five times ankylosis (in

good position, 3 with slight flexion, and with flexion at a right angle). As to the length of the limbs we note: 3 times no difference between the diseased and healthy leg; in one case a slight shortening of diseased extremity, and twice an elongation of 1 and $1\frac{1}{2}$ cm. respectively. The author has collected 63 further cases of Volkmann, König and others, and an analysis of these and his own brings him to the following conclusions: 10% died of diseases not connected with the operation; in 27% the operation was unsuccessful on account of recurrence of the disease, resulting in the establishment of fistulæ or necessitating resection or amputation; 63% were cured; and in three of these cases an elongation of the diseased extremity resulted, due to a decrease of the intra-articular tension after excision of the capsule and ligaments. Flexions of a slight degree are noted in 53% of the cases. Hoffa, some years ago, expressed the opinion that the shortening of the limb was not greater after resection than after conservative treatment, provided the operation was done in the epiphysis of the femur. Mandry, on the contrary, is of the opinion that even arthrectomy gives better results. On the other hand, the author acknowledges that after arthrectomy there exists a greater tendency to flexions (55%). The ideal result of such operations is a movable joint, (unattainable by typical resection), but then after the operation the limbs ought to be treated by electricity, active and passive movements, etc., instead of being put up in immobilizing dressings. The danger of a resulting flail-joint is considered very small by the author. Of the 44 cases that did well after the operation, 8 recovered with movable joints, and 6 of these with almost normal mobility. In conclusion he calls attention to the possibility of overlooking foci in the interior of the bones, which risk is, however, also run in resecting only very thin layers from the articulating surfaces, as advocated by the adherents of typical resection.—*Beitrage zur Klinischen Chirurgie. Mittheilungen aus der chirurg. Klinik zu Tuebingen.* Bd. iii, hft. 2.

FRED. KAMMERER (New York.)

GYNÆCOLOGICAL.

I. Case of Inversion and Prolapsus of Female Bladder through the Urethra. By DR. ARDALION V. PERSHIN (Kazan Russia). A lively, strong and healthy girl, æt. 8. while engaged in carrying a heavy burden in each hand, suddenly felt an agonizing pain about her pelvis and ostium vaginae, which was followed by frequent vesical tenesmus, with an incessant flow of blood-stained urine, drop by drop. She passed a sleepless night and the next morning was brought to Professor N. N. Fenomenoff's clinic where there was found a plum-sized and plum-shaped, intensely red, velvety, elastic and very tender tumor, with numerous longitudinal and transverse rugæ, protruding from the urethra which was filled up with a pedicle of the same description. A probe introduced into the urethra side by side with the pedicle could penetrate only to the depth of $1\frac{1}{2}$ cm. Its introduction was followed by a jerking flow of bloody urine. The child complained of incessant desire to pass water, which she could not satisfy, the urine escaping only by drops. With great trouble, the tumor was reduced by fingers through the urethra which proved to be considerably dilated and congested. A small cotton-wool plug was inserted between her labia and an icebag placed over the bladder. Pain markedly subsided. On the 3d day after the accident, however, diarrhœa supervened, and, during straining, the tumor as painful as before reappeared, this time being larger than before. On the 4th day it was again reduced, and catheterization every three hours was resorted to, in addition to the measures previously adopted. The catheter (Nelaton's, No. 18) could pass not more deeply than 2.5 cm., and each time removed not more than a spoonful of bloody urine. About the 6th day, the girl's urine became normal, though remaining still very scanty; pain disappeared, while the appetite greatly improved. On the 9th day, diarrhœa with straining gave rise to the reappearance of the tumor, which, however, was far smaller than previously and could be reduced comparatively easily.

On the 11th day, she was discharged according to her parents' desire. About one and a half year later the girl came to Professor

Fenomenoff again to state that the tumor had never returned since her discharge, but ever since she had been suffering from excessively frequent micturition to which of late a profuse vaginal leucorrhœa had been added. On examination, "her external genitals were found to be normal, but the external orifice of the urethra was considerably dilated, while its lips (of a pale rose color) were everted along the whole periphery, so that at the site of the meatus there was present a kind of swelling, of the size of a small cherry, with a hole at the top." Analyzing this case, Dr. Pershin says that it was undoubtedly a typical instance of acute prolapsus of the vesical and urethral mucous membrane, which had become separated and descended under the influence of excessive muscular efforts involving an undue straining of the abdominal parietes. It could not be a prolapsus of the urethral *mucosa* alone, since, 1, the tumor had a too considerable size; 2, it was traversed not only by longitudinal, but also by intercrossing transverse rugæ; and 3, the urine was flowing incessantly and only by drops (could not be retained by the bladder). Reviewing the international literature on the subject, Dr. Pershin draws attention that all the cases which have been reported up to the present, under the name of "Inversion and Prolapsus of the Bladder" are in reality nothing else than a simple separation and prolapsus of the vesico-urethral mucous coat alone.

None of the authors, including Dr. Patron, of Gibraltar, bring forward any substantial proofs for supporting their assertions that the muscular and serous coats of the viscus have been inverted and prolapsed in their patients: hence Dr. Pershin proposes to change the usual name of the lesion in the sense indicated. The writer dwells on a striking rarity of affections of female bladder and urethra generally. Thus, amongst 16,097 women treated in several large hospitals in Vienna and Berlin during 1874, only 48 had vesical and urethral disease; of these 22 had vesico-vaginal fistula. According to Dr. Dobrynin's report on the work of the Nalydinsky lying-in hospital, not a single one amongst 10,960 parturients suffered from any vesical or urethral affection. Amongst 5,580 women treated as out-door patients at the Kazan gynæcological clinic between 1876 and 1888, only

22 had some diseases of the kind, 19 of them suffering from vesico-vaginal fistula. Prolapsus of the vesico-urethral *mucosa* occurs exceedingly rarely. Dr. Patron who met a case of the kind (in a girl of 14) in 1857, could collect only 8 similar cases in the preceding literature, of which 7 were referring to children, and only 1 concerned a woman of 52. Later on, Weinlechner reported the case of a baby of nine months [and Oliver that of a girl of 16 months, Beatty that of 2 years, and Thompson that of a woman, aged 40.—*Reporter*]. According to Dr Pershin, his case stands quite isolated as far as its etiology is concerned. Of all his predecessors' cases, only one was of an acute variety; it was de Haen's case of a woman who had fallen from a considerable height and contracted acute prolapsus of the rectum, vagina and bladder to die from peritonitis shortly afterwards. In the remaining cases recorded, the affection was said to have developed (mostly in weak, emaciated, ill subjects) but in a gradual or chronic way.—*Dnevnik Kazanskaho Obshtchestva Vrachëi*, (Kazan, Russia), No. 9, 1888.

II. Case of Fistulorrhaphy for Utero-Vesical Fistula.

By DR. SOPHIA V. FILIMONOVA (St. Petersburg).—An undersized rachitic woman, æt. 35, complained of an incessant flow of urine from her vagina in sitting or recumbent posture, which symptoms had appeared immediately after her twelfth labor, seven months previously. The external os was found to be triangular, admitting a finger, its anterior lip everted and lacerated, the posterior one cicatricially shrunken and the cervical canal was dilated. On its anterior wall, about 1 cm. above the lower edge of the anterior lip, there was seen an oval opening, admitting a middle-sized male catheter, its edges being firm and cicatricially contracted. The catheter introduced into the opening passed into the bladder, in an oblique direction, upward and rightward. Fistulorrhaphy was performed as follows: Having placed the woman in the knee-and-elbow posture, Professor Sebedeff introduced into the vagina a Neugebauer's speculum, dragged the cervix (by means of two bullet forceps) downward, close to the introitus, inserted a probe into the fistula, split up the cervix along its right side,

freshened the fistula, which procedure showed that the latter had a funnel-shaped configuration, the uterine opening being considerably narrower than the vesical one, applied four sublimated silk sutures, washed out the parts with a 5 per cent carbolic solution, powdered with iodoform, and inserted a gauze plug. For the first three days there were slight paroxysmal pain about the womb, with occasional hæmaturia and oozing of blood from the vagina. On the ninth day the sutures were removed, the lesion being found healed *per primam*. On the eighteenth day, trachelorrhaphy was performed to close both the incision which had been made during fistulorrhaphy and the lacerations contracted during several labors. Ten days after trachelorrhaphy (the twenty-eighth after fistulorrhaphy) the patient left the hospital well and sound in all regards. Dr. Filimonova draws attention to the rarity of utero-vesical fistula, and the still greater rarity of cases closed by operation. She was able to find in international literature not more than fourteen cases of the lesion where fistulorrhaphy had been performed (Jobert de Lamballe [1849], Simon, Spiegelberg, Kaltenbach, Lossen, Mueller, Martin, Winckel [5 cases], Wilms). Another interesting feature of her case is the fact that the fistula followed an early, quite regular delivery of a small-sized female infant in a regular (1st anterior) occipital presentation—utero-vesical fistulæ usually arising during protracted difficult labors, with irregular presentation of large-sized male foetuses.—*Ejenedelnaia Klinitcheskaia Gazeta*, No. 6, 1888.

III. Suprapubic Cystotomy for Stone in a Little Girl. By Dr. STANISLAV A. VOINS (Odessa, Russia). A small-sized, extremely anæmic and emaciated Jewish girl, æt. 8, was admitted with incessant agonizing vesical pain and considerably distended bladder. Owing to an abnormally low situation of the urethral orifice (close to the vaginal inlet), the exploration could be effected only with great difficulty, after the dilatation of the urethra by means of hooks. A large sized stone was detected, and five days later the suprapubic operation was performed. The rectal bag (improvised from two elastic condoms) with 118 grammes of fluid was used, the bladder being distended with 175

grammes of a warm thymol solution. The median abdominal incision measured 5 or 6 centimetres in length, the peritoneal fold standing 3 or 4 centimetres above the pubes. (Cf. Dr. A. B. Strong's measurements in the ANNALS OF SURGERY, vol. vii., p. 31, January, 1888.) The incision into the bladder was 2 cm. long. Three smooth, flattened, oval urate stones, measuring from $2\frac{1}{4}$ to 3 centimetres in their largest diameter, and weighing together 26.5 grammes, were extracted by means of bone forceps, after which the bladder and adjoining parts were washed out with thymol, the vesical wound (except the mucous layer) closed with 7 nodose catgut sutures, a drainage tube introduced into the abdominal wound, the remaining portion of the latter stitched with deep catgut and superficial silk sutures and antiseptic dressing applied, and a Nélaton's catheter *a demeure* inserted into the bladder. The little girl bore the operation quite satisfactorily. On the fifth day all her urine commenced to flow through the lower angle of the abdominal wound. On the twenty-eighth, a piece of sloughed tissues containing several vesical sutures was discharged with the urine, after which the granulation process went on rapidly, and the urine began again to pass through the catheter, which could be dispensed with on the 49th day. The girl's general state, however, remained fairly good all the while. There were occasionally mild febrile movements about nightfall at an early stage, but from the 27th day the temperature became normal. On the 62d day the patient was discharged quite well, with her wound soundly united.—*Proceedings of the Odessa Medical Society for 1887*, Vol. xvii, No. 6.

EXTREMITIES.

I. Case of Late Hæmorrhage from a Wound of the Hand. By Dr. M. R. OSMOLOVSKY (Russia). A soldier received a lacerated wound in the inner part of his left hypothenar eminence. The laceration had the shape of the letter **Z** and was fairly deep. No foreign bodies could be detected in the tissues injured. Hæmorrhage was very considerable, but could ultimately be controlled by means of a compressing bandage with a plug of hæmostatic cotton-wool. About the fifth day the wound was found united *per primam*, except at the

angles which were still gaping. About the twelfth day, however, the lateral surfaces of the wound were also seen covered with granulations while the bottom seemed to be coated only with small adherent blood-clots. During the night of the fourteenth, persistent hæmorrhage from the wound suddenly appeared. Esmarch's bandage was applied and left for the whole night. In the morning of the fifteenth day "a strongly pulsating tumor, of the size of a walnut, was discovered at the site of the wound, with two dark spots at the top", from which spots two powerful jets of blood soon began to play. A ligature of the brachial artery in the cubital bend was now made; the palmar bleeding still continued for a while afterwards. Subsequently the swelling gradually decreased. The first pulsation in the radial artery was noticed twelve days after the ligature, becoming normal after twelve days. The palmar wound was found healed on the fortieth day after the accident. — *Voënno-Sanitarnoë Dželo*, No. 1 1888.

II. Actinomycosis of Thigh. By Dr. A. V. MININ (St. Petersburg). A well-made and nourished soldier, æt. 21, was admitted on account of a constant, vague, aching pain in the upper third of his left thigh posteriorly, just below the gluteal fold. On examination the integuments were found normal, but deep in the biceps femoris there was a tender induration of the size of the palm. About 17 days later there appeared what was thought to be "signs of a circumscribed inflammation of subcutaneous cellular tissue." Accordingly a longitudinal incision, 5 centimetres long, was made downward from the gluteal plica to scrape out, by means of Volkmann's spoon, "a semi-fluid, firmish mass, which easily broke into hard lumps of a grayish brown color." A cavity of the size of two fists, left between the great gluteus and posterior femoral muscles, was washed out with a sublimate solution and plugged up with iodoform gauze. The man's temperature, which before the operation had been rising up to 38.4° C., in the evenings, became henceforward normal. The cavity, however, showed but a very slight tendency to healing, and continued to discharge a mucoïd matter with lumps which were thought to be particles of disintegrating tissues. About two months after the first operation

a considerable swelling was noticed just below the cavity. Another incision, 7 cm. long, was made across the fistula and swelling. After dissecting and hooking aside the sciatic nerve, the tissues exposed were carefully scraped out and cauterized with the thermocautery, and the cavity filled up with iodoform gauze. Henceforward a steady, though very gradual, improvement set in. About ten weeks after the second operation the man was discharged with a fine fistulous opening which ultimately closed, not before another ten weeks had elapsed. The diagnosis was made only after the second operation when the mass scraped out was subjected to a microscopical examination, which showed that the lumps consisted of "entangling threads of actinomyces with their characteristic club-shaped inflations." Inquiry elicited the fact that the patient before entering the ranks, had been habitually brought into contact with horses, by sleeping at stables and otherwise. Dr. Minin believes that actinomycosis is by no means as infrequent in man as is commonly supposed.—*Khürürgitchesky Vestnik*, March and April, 1888.

III. Case of Acute Multiple Osteomyelitis, ending in Recovery. By DR. SEMION G. SHALITA (Kiev, Russia.) A boy, æt. three years and a half, hitherto quite healthy, of healthy Hebrew parentage, was admitted three weeks after a trifling accidental contusion of his left leg, which had been followed in the same evening by intense rigor, heat, and excruciating pain about the limb, and, on the next day, by swelling of the latter, and anorexia and prostration which symptoms had been growing worse ever since. On examination, the boy "had the appearance of a typhoid patient," was pale, extremely emaciated with aching pain all over body, feverish (40° C. in the morning), and suffering from severe offensive diarrhoea. "His left leg formed one purulent gathering occupying the whole internal surface from the knee-joint (containing profuse effusion) down to the ankle-joint." There was, further, a large abscess on the left side from the fifth to ninth ribs, reaching anteriorly beyond the mamillary line and posteriorly up to the inferior angle of the shoulder blade. A third abscess was situated in the left temporal region. The integuments all over the

body were perfectly intact and there were no furuncles, abrasions or the like. A "spontaneous multiple osteomyelitis" was diagnosed by Dr Shalita, and energetic surgical treatment was resorted to, without a moment's delay. The patient having been carefully washed and brought under chloroform, a longitudinal incision involving the upper two thirds of the leg was made to give vent to an enormous quantity of pus mixed with shreds of cellular tissue. Having incised the periosteum which "was as thick as half a finger's breadth," Dr. Shalita found that "the tibia lay quite free as a total sequestrum within a periosteal sac filled with pus." The dead bone was taken with two fingers and extracted through the wound without the slightest difficulty. The next step was to make a long incision parallel with the inferior edge of the scapula. Pus having escaped, the fifth, sixth, seventh, eighth and ninth ribs presented themselves lying totally bare, while between the fifth and sixth ribs, "there was seen a fine opening from which pus welled out like a fountain." No free sequestra could be detected at the time. An incision across the temporal abscess similarly showed an extensive separation of the periosteum from the frontal and temporal bones. All three wounds were washed out with a corrosive sublimate lotion, scraped out with a sharp spoon, partly stitched, and dressed antiseptically, while the leg was put up in splints. For the next ten days or so, the patient's state was simply nothing but a "desperate struggle between death and life." About the 11th day, a total sequestrum "of the size of a phalanx" was removed from the fifth rib. From the 19th day, the temperature returned to the standard, and a most striking universal improvement commenced to proceed rapidly to a complete recovery. When examined six weeks after the operation, the boy looked plump and rosy; the temporal incision had healed perfectly; the costal abscess was represented only by a long cicatrix partially adherent to the subjacent ribs, no osseous defect being felt through the soft parts, the knee-joint was healthy; the removed tibia was *totally* replaced by a fairly thick and normally hard new formed bone; and both lower extremities *were of an equal length*. Dr. Shalita attributed the favorable issue of this seemingly hopeless case solely to the surgical measures adopted by him. A too conservative management

(aspiration of pus, small incisions, etc., as recommended by Demme, Billroth, Volkmann, etc., in osteomyelitis) could not possibly have prevented pyæmia or degeneration of internal organs with a fatal termination.—*Khirurgichesky Vestnik*, January, 1888.

CHEST AND ABDOMEN.

I. Sculptor's White Clay in Mastitis. By Dr. E. L. MAISEL (Russia.) Sculptors' white clay having been used with success in epididymitis Dr. E. L. Maisel has followed the same plan of treatment in 12 cases of mastitis. In 7 of them parenchymatous mastitis (3 in the stage of suppuration) was present, and in 5 phlegmon (in 4 of which resolution, and in 1 suppuration took place.) Having prepared a homogeneous (lumpless) paste by mixing clay with water, he spread it in a thick even layer, over a circular piece of calico or soft gauze sufficiently large to cover the whole mamma and containing a hole in its centre for the nipple. Then, having sponged off the breast and covered it with a piece of soft gauze, he placed above it the clay cake to fit it firmly and accurately all over the parts. The dressing was fixed by a handkerchief passing over the opposite shoulder and across the axilla of the affected side. It was changed twice a day in the morning and evening. The results were said to be excellent. Pain was relieved very rapidly, and heat and tension strikingly decreased. When the treatment was resorted to at an early stage no suppuration but a steady resolution ensued. In cases of suppuration the dressing promoted a speedy healing of the incision, as well as a rapid resolution of indurated nodi. White clay is a favorite remedy with the Russian peasantry. It is very cheap. Its method of application is easy, simple and very much liked by patients. Its therapeutic properties are thought to be very considerable. White clay possesses a mighty heat absorbing power and hence can be employed as a most effective and convenient substitute for ice bags and cold compresses which are rather disliked by patients and, at all events, involve far more trouble and time. By virtue of its producing an equal continuous pressure on the whole breast, the clay dressing promotes absorption of morbid products. In conclusion Dr. Maisel draws attention to the

fact that sculptor's clay used in the same way renders the best possible service as a milk inhibiting means in irritable and nervous or weak women who are unable to suckle their babies. Pain, tenderness and swelling of breasts disappear, under a clay cake in about 24 hours.—*Vratch*, No. 21, 1888.

V. IDELSON (Berne.)

I. Contribution to the Literature of Resection of the Pylorus ; Statistics of the Frequency of Metastases in Carcinoma of the Pylorus. By DR. BENEDICT STREIT (Berne). Three cases of carcinoma of the pylorus with resections by Prof. Kocher of Berne, are reported. In these operations it is first remarked that narcosis was initiated with chloroform and continued after insensibility, with ether, paralysis of the heart being eliminated by this method as much as possible. Chilling of the peritoneum was avoided in protracted operations by warm compresses. The cases operated upon were carcinoma ventriculi. All recovered from the operation. Case 1, female, æt. 42, died after two years with stenosis of the pylorus. Case 2, female, æt. 63, is still living two years after operation without return of the disease. Case 3, male, æt. 34, died 6 months after operation with a return of the disease and stenosis of the pylorus. One of the cases contained a number of small nodular growths in the vicinity of the primary growth with nodules in the mesentery. Here as in tumors of the mammary gland the prognosis is not as favorable as in cases where only one tumor exists. Vomiting after resection of the pylorus is not common, but yet a symptom fatal to the integrity of the sutures placed in the resected parts. The frequency of stenosis of the pylorus in all cases of resection is now admitted but the factors causing it are still obscure. The method of operating (Kocher's) can hardly be laid down as a chief factor in the formation of cicatricial tissue. But the author thinks that extensive peritonitic adhesions being present before operation we may reasonable expect the above complication (stenosis) after resection. The author enters into the peculiarities of Kocher's resection as differing from Billroth's. Kocher uses the continuous suture in uniting the duodenum and stomach. Catgut takes the place of silk. The author mentions a number of cases in the

Berne clinic of *infection from catgut*. This was probably due to the mode of manufacture or the use of material from diseased animals; particulars will be published later. The results of operation, now encouraging can be much improved by the earlier diagnosis of the disease and therefore early operation.

The author has collated 54 cases of carcinoma ventriculi (1870-86) upon which post mortems were obtained with the following result. He has classified those post mortems as eventually operable cases in which there were no metastases, no adhesions with pancreas, colon, or liver or in which the stomach was not greatly involved. Operable 25.9%, inoperable 79.1%.

He advocates an early explorative laparotomy in doubtful cases to determine the exact conditions of the growths.—*Zeitsch. f. Chir.*, bd. xxvii, heft. 5 u. 6.

HENRY KOPLIK (New York).

III. Suture of Ruptured Bladder. By H. P. SYMONDS (Oxford). At the meeting of the Clinical Society, May 11, Mr. Symonds described the operation of suturing a ruptured bladder in a girl aged seven. A difficulty in diagnosis arose from the presence in the hypogastric region of a prominence resembling a moderately distended bladder, which however was not reduced by passing a catheter. This prominence was considered to be due to urine lying in the pelvic portion of the peritoneal cavity from which the intestines were floated up. The rent was situated just below the apex, and involved chiefly but not entirely the extra-peritoneal portion of the bladder. Twenty Lembert's sutures were inserted, and the peritoneal cavity washed out with a weak carbolic and sublimate solution, the wound closed and a catheter tied into the bladder. The child did not recover from its collapse and the post-mortem (on the eighth day) revealed pus on the side of the bladder and extending into the ilio-lumbar region, the extra-peritoneal portion of the sutures having given way. Mr. Symonds considers that it would have been wiser to have left the extra-peritoneal portion of the bladder unsutured and to have inserted a drainage tube. and other members agreed with the latter but not with the former of these opinions.—*Lancet*, May 19, 1888.

A. F. STREET (Westgate).

REVIEWS OF BOOKS.

ELEMENTS DE PATHOLOGIE CHIRURGICALE GENERALE par S. BAUDRY,
Professor a la Faculté de Médecine de Lille. Paris, Adrien Dela-
haye and Emile Lecrosnier, 1886-8. 8 vo., p. 716.

ELEMENTS OF GENERAL SURGICAL PATHOLOGY.

In his preface the author describes his intention as being not to write a complete treatise, but to diffuse a knowledge of the labors of predecessors by summarizing them as clearly as possible.

The result is, upon the whole, very good. We know of no English work which gives so complete and clear an account of the general surgical pathology of the day. The evidences of extensive reading and of acquaintance with the latest and best researches into the different parts of the subject make the work very interesting as well as useful.

To analyze one chapter of the book, let us take the third. It is on "The reciprocal influence of Diseases and Traumatisms." Its first section deals with diathetic diseases, *e. g.*, gout, rheumatism, cancer. The second section treats of "constitutional dystrophies," including diabetes, scurvy, leucocythemia, and hæmophilia. The third considers infectious diseases, acute and chronic, such as typhoid fever, scrofula, syphilis and "paludism." To give an idea of the style and method of the book a portion of this may be quoted.

"PALUDISM.—The word *paludism* (Verneuil) signifies a poisoning characterized by intermittent or remittent fever and by a special cachectic state of which the chief attributes are considerable and quickly appearing anæmia, a diminution in number and an alteration of the globules of the blood, splenic hypertrophy, visceral alterations (of the liver, kidneys, etc.) Paludism constitutes a general morbid state whose influence upon traumatic lesions has now been clearly demonstrated by most numerous and convincing facts."

"Delpech, Lafont-Gouzy, and, afterwards, Bouisson, published the first accounts of complications (intermittent hæmorrhages, neuralgias, fevers, etc.) caused by malarial infection. In 1866 and 1867, Cocud,

Professor Mazzini, of Rome, and Duboué, of Pau, drew the attention of surgeons to these complications, and, in the following year, Verneuil inspired the first comprehensive work on the subject, that of one of his pupils, M. Dériaud. The question having been once opened, other papers appeared quickly; Moriez, Siègry, Taiebould Morsly, Valerani, etc., added their quota of cases. More recently we may cite the memoirs of Verneuil and L. H. Petit, the communication of M. Dehenne to the first French Congress of Surgery, the articles of Dr. Coe, and of Dr. Jules Roquette (D'Espalion) and the excellent contribution of M. Corré in his clinical treatise on the maladies of warm countries."

(Full references to all the above are given in 14 foot notes.)

"The nature and the intensity of the accident or complications which paludism causes in conjunction with traumatism varies with the period and the degree of the malarial intoxication in which the wounded person is, and also depends on whether he is still exposed to the infection or has been more or less long removed from it. The influence of race has also to be considered."

"In the first period, the happy results which have been got from great operations performed during expeditions in Algeria prove that the repair of accidental or operative wounds is not sensibly impeded by malarious influences: nevertheless these tend to produce certain local accidents or phenomena, among which the most constant are congestions, hæmorrhages, spasms or neuralgic pains, with a periodic character most clearly marked, and which are readily cured by sulphate of quinine (Verneuil, Cocud, etc.)." * * *

"When the cachectic period of malarious intoxication has arrived, that is to say, when lesions of the viscera (spleen, liver, kidneys, heart, etc.) are present, then wounds are threatened with most serious complications. In spite of Listerian dressings and of the administration of quinine, union by the first intention fails, trivial wounds suppurate, heal with difficulty, or ulcerate and become phagedænic. Sometimes, even, diffuse phlegmon, cellulitis, lymphangitis, erysipelas, pyæmia, gangrene, etc., quickly carry off the patient. Finally, according to Taiebould Morsly, paludism retards the consolidation of fractures as well as the repair of wounds. Roux is of a different opinion. He thinks there has been a general exaggeration of the influence of malarious infection on traumatism. 'I have never observed,' says he 'that the cure of fractures takes longer in India than in France. Among the Bengalis, almost all of whom are affected with a variable degree of "paludian cachexia," I have had magnificent operative results without any acci-

dent: cure was even much more rapid than in Europe.' Naval surgeons who have practiced in various malarial countries make the same statements."

The full, fair and interesting character of the above extract is that of the whole book.

C. B. KEETLEY.

THE BEST SURGICAL DRESSING.—HOW TO PREPARE IT AND HOW TO USE IT; WITH A CONSIDERATION OF BEACH'S PRINCIPLE OF BULLET-WOUND TREATMENT. By OTIS K. NEWELL, M.D., Assistant Demonstrator of Anatomy at Harvard Medical School; Surgeon to Out-Patients at the Massachusetts General Hospital, etc.; Boston, Cupples & Hurd, 1888, 12 mo. pp. 179; Price, \$1.00.

The greater portion of this book and practically all of that portion relating to "the best surgical dressing" consists of a translation of Mikulicz's paper on the use of iodoform in surgery in the *Wiener Klinik* of January 1882. The paper is of great interest, and we are glad to have it made accessible to students of surgery who are so unfortunate as to be unable to read it in the original.

The remainder of the book is occupied by a brief consideration of the practice of primary antiseptic healing of bullet wounds without attempting the removal of the missile, the establishment of which he claims for Dr. H. A. Beach, of Boston. In support of this claim he quotes six cases from the records of the Massachusetts General Hospital, all of which were treated according to this principle in 1881 and 1882. He reports two others treated in 1876 and 1879, but as the bullet was left undisturbed in these cases only because it was impracticable to remove it, they can hardly be properly considered in support of his claim for Dr. Beach, while Reyher's work in the same line during the Turko-Russian war was published in 1878. The author can hardly be acknowledged to have indicated the propriety of the expression, "Beach's principle" in regard to this procedure.

The book is beautifully gotten up, and is a very creditable production, although it would perhaps have been less assuming had the author coupled Professor Mikulicz's name with his own upon the title-page.

JAMES E. PILCHER.

ARBEITEN AUS DER CHIRURGISCHEN KLINIK DER K. UNIV. BERLIN.
E. VON BERGMANN. Theil II und III. 1887, New York, G. E. Steohert.

CONTRIBUTIONS FROM THE SURGICAL CLINIC OF THE ROYAL UNIVERSITY.

These contributions, which consist of two goodly sized volumes, present the results of the labors of one of the foremost of our clinicians and his pupils. Some of these have already appeared in review in the pages of the ANNALS OF SURGERY. Part II contains the works of Prof. von Bergmann on "Echinococci of the Long Bones," and also smaller articles by Dr. Bramann on "Chylous Cysts of the Mesentery," "An Inquiry into the Status of Iodoform in Surgery," by De Ruyter, "Arthropathy Tabidorum," by Dr. Josef Rotter, and "The Treatment of Wounds by means of the Iodoform Tamponade," by Dr. Bramann. In the last named article Dr. Bramann gives the details of a mode of treatment for years in vogue in the clinic of his chief. The gauze is first sterilized in the steam sterilizer for a quarter to a half hour, and then impregnated with the iodoform solution. In minor surgical procedures sterilized gauze unimpregnated has alone been used.

In cases in which there is an abundant discharge of secretions, the gauze impregnated with a certain percentage of sublimate is used. The cotton used in this clinic is also sterilized, *but not* impregnated with any agent. The rubber cloths and towels used in the vicinity of the operating field, are treated in a similar manner. The silk used in suture is sterilized in steam (100° C.) and then stored in metal boxes until used. Catgut only is used for ligature; as a suture it is chiefly employed for the continuous suture. The raw catgut is placed for ten to fourteen days in sublimate 4-800 alcohol, 200 aq. dest., which is frequently renewed. It is then put into alcohol, 1:800 with 200 water, and preserved for use in this solution. With this method the catgut retains its original tenacity. During operation the wound is irrigated with sublimate 1:2000. In the abdomen and pleural cavity wounds are simply *sponged* with the solution. The dictum of Prof. v. Bergman that antiseptis demands a most complete arrest of hæmorrhage is strictly adhered to. In those cases, however, where a thorough arrest of hæmorrhage is made impossible by the nature of the wound (operations in the axilla), or where a coagulum would be liable to decompose or cause pressure effects, the following procedure is adopted. The wound is thoroughly cleansed with sublimate 1:2000 and then sponged with ether-iodoform solution and packed with broad iodoform gauze, one, two or more metres long. The extremity of the gauze protrudes from the wound. At present no sutures are employed, and after two or three days the wound is found dry and free from secretion or reaction; it is then sutured with or without a drainage. This method is almost identical with that of Kocher, except that it is not so universally employed. The method has given brilliant re-

sults in wounds of the most varied character—in operations upon the rectum, cranial bones, brain, orbit, and in resections. It has found its widest and most striking applications in tuberculosis of the bones and the operations in this field.

Part III contains articles by Drs. Schlange, Scheuerlein, Fehleisen, DeRuyter, Prof. von Bergmann, and Dr. F. Bramann, upon "The Sterilized Dressing," "The Origin of Suppuration," "The Etiology of Suppuration," "The Iodoform Question," "The Surgical Treatment of Diseases of the Brain," and "Two Cases of Patent Urachus in the Adult," some of which will be noticed in detail in future numbers.

HENRY KOPLIK.

ARBEITEN AUS DER CHIRURGISCHEN UNIVERSITÄTS-POLIKLINIK ZU LEIPZIG. Herausgegeben von Prof. Dr. BENNO SCHMIDT. I. Heft. Leipzig, F. C. W. Vogel. 1888. New York, G. E. Stechert.

PAPERS FROM THE SURGICAL DISPENSARY OF THE UNIVERSITY OF LEIPZIG.

The public dispensaries connected with the Leipsic University having been provided with a suitably equipped new building, the chief of the surgical department celebrates this event by editing a series of papers founded upon cases observed and treated in this institution. The majority of the papers were written as dissertations for obtaining the degree of M. D. by dispensary students.

The present collection contains almost entirely descriptions of cases.

1. *On congenital luxations of the knee.* By Dr. Carl Muller. A boy three weeks old admitted with the diagnosis "luxatio tibiæ præfemoralis congenita;" cured by replacement and splint in one week.

The author quotes and classifies 17 other similar cases from literature and adds pathological and mechanical remarks. In a postscript the editor adds two further cases of congenital luxation of the knee-joint, with remarks.

2. *A case of localized tuberculosis of the skin due to direct inoculation.* By Dr. Martin Benno Schmidt. A healthy woman was bitten in the lips by her dying and phthisical husband. Subsequently she pricked her finger and probably infected this wound by means of the lip. In both places tuberculous noduli developed, which were excised and microscopically examined. They proved to be tuberculous in character. Eighteen further cases are collected and abstracted.

3. *A case of traumatic displacement of the lower row of carpal bones backwards.* By the editor and Alfred Schmidt. Dislocation by a fall of the ossa capitatum, hamatum and multangulum minus,

(trapezoid, magnum and unciforme.) The bones had not been replaced. Improvement by massage.

4. *Two cases of congenital malformation of the lower extremities.* By the editor and Dr. Dinter. Both cases are classified as the intra-uterine fracture of the tibia of Braun. But as the fibula is absent in one case, and the toes are not normally developed this classification is called in question by the author, who suggests two great a tension of the skin over the parts affected as a cause for deformities.

5. *A case of coccygeal tumor.* By Dr. Martin Benno Schmidt. Complete clinical and pathological description of a cystic tumor over the coccyx in a child of 9 months and its removal, with remarks as to its probable origin from the conus medullaris.

6. *Contributions to vesical surgery. A.—Operative treatment of hypertrophied prostate.* By the editor and R. Meyer. Two cases in which the editor performed suprapubic cystotomy and exsected the middle prostatic lobe by galvanocautery. Ages 67 and 72 respectively. One case complicated with stone, the other with cystitis. In both cases improvement occurred, by reason of diminished cystitis and extraction of stones; but in neither case did the ability to urinate voluntarily return. The editor attributes this to failure to dilate the prostatic urethra.

He believes excision of the middle lobe of the prostate only indicated when the rest of the prostate is not enlarged; but prefers the supra-pubic method for its removal. Complications with the disease of other organs behind the bladder contraindicate all interference.

B.—Three cases of tumor of the bladder. By the editor, Drs. Schadenbrod and Kollath,

(1). Villous tumor of the bladder; occlusion of right ureter, cystitis, nephritis. Death on fourth day. No operation. Autopsy.—A second tumor of benign papillary character was found near the right ureter.

(2). Patient, æt. 62, suffered for two years from hæmaturia. Microscopically portions of a villous tumor found in urine. Sectio alta; ablation of tumor. Dismissed improved. Death four months later from inanition. No recurrence of hæmorrhage.

(3). Primary cancer of bladder with metastases, in man æt. 51 years. Sectio alta. Tumor scraped out, Wound packed with iodoformized gauze. Death one month later. Autopsy.

ZUR URANOPLASTIK, STAPHYLORRHAPHIE UND PROTHESE. Von Dr. med. LUDWIG BRANDT in Berlin. Berlin, 1888. Aug. Hirschwald; New York, G. E. Stechert.

URANOPLASTY, STAPHYLORRHAPHY AND PROTHESIS.

Mamy surgeons having of late expressed an opinion that artificial palates and pharyngeal obturators had been superseded by plastic operations, the author takes exception to this view. He concedes that in early life and after traumatisms plastic operations have beneficial results. But for the purpose of improving articulation in adults, in syphilitic destruction, etc., a prothesis can be employed with more advantage than operative procedures, especially as unsuccessful operative attempts greatly interfere with the efficient application of an artificial palate.

The author has constructed original protheses consisting of inflatable india-rubber or goldbeaterskin bags, which are introduced in a collapsed state into the palatine apertures and the pharyngeal space, and can then be inflated *in situ* by the patient himself. These neither interfere with the natural play of the muscles, nor become macerated. The muscular action displaces the air from one portion, and forces it to the point where it is most necessary. Sketches accompany the pamphlet.

ALLGEMEINE UND SPECIELLE ORTHOPÆDISCHE CHIRURGIE MIT EINSCHLUSS DER ORTHOPÆDISCHEN OPERATIONEN. Von Dr. AUGUST SCHREIBER, Leipzig und Wien, Franz Deuticke, 1888. New York, G. E. Stechert.

GENERAL AND SPECIAL ORTHOPEDIC SURGERY, INCLUDING ORTHOPEDIC OPERATIONS.

Readers of the *ANNALS OF SURGERY* are not unacquainted with the author of this volume, the chief surgeon of the Hospital at Augsburg, reviews of his monographs on the same subject having been before presented.

In the present text-book he aims to give us a complete survey of modern orthopedic surgery. The historical aspect of the subject has been duly considered as well, and whenever the older methods possess special advantages they have been correspondingly brought forward. The etiology and pathology of the various disorders have received sufficiently minute attention to render the methods of treatment intelligible to the student and permit an insight into the conditions favoring an early diagnosis.

Numerous and complete lists of the literature of each subject are given; and the text is illustrated throughout with excellent wood-cuts and photogravures.

W. W. VAN ARSDALE.

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